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# JOURNAL

OF THE

# ROYAL HORTICULTURAL SOCIETY

ESTABLISHED  
A.D. 1804



ROYAL CHARTERS  
A.D. 1809, 1860, 1899

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EDITED BY  
F. J. CHITTENDEN, F.L.S., V.M.H.

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VOL. LI.

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1926

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LONDON:  
THE ROYAL HORTICULTURAL SOCIETY, R.H. HALL, VINCENT SQ., S.W. 1.

*Part I. published January 29, 1926.*  
*Part II. published November 30, 1926.*

Printed for the Royal Horticultural Society  
BY  
SPOTTISWOODE, BALLANTYNE & CO. LTD., LONDON, COLCHESTER AND ETON.

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#### NOTICE TO BINDER.

Volume LI has been issued in two parts, each containing the 'Journal' proper, paged with Arabic figures, and 'Extracts from the Proceedings' paged in Roman figures. This title and contents sheet should be placed first, and be followed by pages 1 to 176, then by pages 177 to 356. After that should come "Extracts from Proceedings," pages i to xcii, xciii to cxxxix, concluding with the General Index.

# JOURNAL

OF THE

## ROYAL HORTICULTURAL SOCIETY.

VOL. LI. PART I. 1926.

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### PROBLEMS OF VEGETATIVE PROPAGATION.

(BEING THE MASTERS LECTURES FOR 1925.)

By Professor J. H. PRIESTLEY, D.S.O., B.Sc., F.L.S.

[Read April 7 and June 23, 1925 ; Dr. A. W. HILL, F.R.S. in the Chair.]

SPEAKING on the subject of Problems of Propagation in the eighth Masters lecture, Sir I. BAYLEY BALFOUR\* pointed out its appropriateness for lectures in commemoration of a man "whose life was devoted to establishing a solid ground of scientific truth for the practice of horticulture." It would seem in keeping with the spirit which promotes these lectures that the problems so brilliantly expounded by BAYLEY BALFOUR, in the light of experience gained from the propagating frame, should now be attacked with the aid of data obtained in the laboratory. On this new ground problems gain rather than lose in complexity, so that progress is necessarily slow.

All that is now attempted is a restatement of the problem of vegetative propagation in terms of the fundamental processes of growth and development, with, as a result, occasional tentative suggestions as to the *raison d'être* of current practices.

### THE NORMAL GROWTH OF THE PLANT.

No statement of the problems of vegetative propagation is possible until the normal process of growth of the flowering plant has been

\* *Jour. Roy. Hort. Soc.*, 38, pt. 3, March 1913, pp. 447-460.

considered. This problem is presented in concrete form each time the seedling commences its development from the seed. The growth processes involved in the higher plant are evidently entirely different in nature from those of the higher animals. At a very early stage, for instance, the human embryo has its full complement of limbs and organs. Subsequently no new limbs or organs appear, but all those already present develop together, perhaps at different relative rates but in harmonious correlation. In the seedling plant, on the other hand, active growth is confined to two regions, as widely apart from one another as the structure of the seedling permits, the growing-points of shoot and root. As the result of the continuous activity of these growing regions new members are continually formed, leaves and branches from the shoot apex, lateral branches upon the root.

We thus find growth mainly confined in the plant to two opposed regions, which are spoken of as the apical or polar "meristems," the adult tissues of the plant which lie between and separate these meristems having been formed in large part, and in many cases entirely, as a result of their previous activity. These two meristems are clearly very different, for they give rise to different adult structures and grow in different directions; their co-operation is necessary to the production of a complete flowering plant, and the maintenance of a balanced activity of *both* will prove to be the main problem of vegetative propagation.

The first problem is then an analysis of the difference between the meristems of shoot and root. This is not at all an easy matter, because any meristem is engaged in the complicated process of growth, i.e. in making new living substance, protoplasm, out of simpler materials. Differences between them ought therefore ultimately to be expressed in terms of this synthesis of living matter, the basal process of growth. Such complicated chemical syntheses defy present laboratory technique, and instead of expressing the analysis of these differences in terms of the chemistry of the living organism or metabolism a more superficial statement must suffice for the present.

Microscopic examination shows that a meristem is always built up of cells which are always relatively small, densely filled with protoplasm, with thin intervening walls, and with a round nucleus of normal size, and which, therefore, occupies a relatively large part of the volume of the small cell. As these characters are common to the cells of any meristem, cells of this type are described as *meristematic*. Actively engaged in a growing plant in the construction of new protoplasm, these small cells rapidly increase in mass, and then divide, the nucleus first, to give rise to two exactly similar meristematic cells. Thus at any growing-point cells are always multiplying in number by increase of cell substance followed by cell division.

Whilst at the actual growing-point increase in living substance, the fundamental process of growth, thus proceeds, a secondary phenomenon of growth, increase in size, is more strikingly shown in a region which borders the meristem, in which meristem cells have ceased to divide and instead increase in volume by the entrance into



the protoplasm of relatively large volumes of water. Thus the vacuolated cell appears, in which, whilst the nucleus is approximately the same size as before, the rest of the protoplasm, the cytoplasm, though not appreciably greater in amount, occupies a very much greater space, because it is distended by the vacuoles which contain a watery fluid, the cell sap. The wall of the vacuolated cell is thicker than that of the meristematic cell.

The statements just made are true of the meristematic cells and neighbouring vacuolated cells of any growing-point, and yet the shoot growing-point of one species clearly differs fundamentally from that of another species, and any shoot growing-point is distinct from any root growing-point.

Unable to trace these differences to their source in differences of metabolism, their tentative analysis will now be made in terms of the microscopic detail just given, but it is fully realized that the analysis is inadequate and of the nature of a first approximation. Starting with the distribution of the meristems at the apices, an attempt is made to correlate distribution with nutrition, and from this to consider differences in the walls of the cells which border upon the meristem.

Differences in the distribution of the meristems at apices of shoot and root immediately strike the observer when the apex in longitudinal section is examined under the microscope (figs. 1 and 2). At the shoot apex the meristem cells are at the surface, just beneath the thin cuticle; the superficial cells are always meristematic, and the cells below continue to divide and to remain meristematic to a depth that varies in different species. As a result of the activities of this superficial layer, growth at the surface of the apex of the shoot is greater than in deeper layers and the additional cells at the surface are accommodated in superficial folds, which form the initials of leaves and new lateral branches. These initials in a normal stem cluster around the actual shoot apex and overtop it as they are pushed up by the vacuolization and increase in size of the cells beneath them. Recent work has shown that the growth of such a shoot apex usually goes on continuously and smoothly, a periodic character being given to it, however, by the separation of new leaf initials from the apex at regular intervals of time.\* Thus SCHMIDT has shown that between the separation of one pair of leaf initials and the next, in a bud with decussate leaf arrangement, the area of the dome of meristem which covers the actual apex grows steadily from a minimal to a maximal area, to start again at the minimum size when part of the outer maximal area is carried up as a superficial meristem covering two new leaf initials.† In the stem of a water plant which grows submerged under water the meristem is still superficial, but the growth of the surface area does not so much exceed that of the inner tissues; lateral leaf folds are slower in

\* SCHÜEPP, OTTO, *Verhandl. der Naturforsch. Ges. in Basel*, xxxiv. pp. 41-68, 1923.

† SCHMIDT, ALEXANDER, *Botanisches Archiv*, 1924, viii. pp. 345-404.

development and do not overtop and surround the conical apex in the same manner (fig. 3).

In the root, on the other hand, the meristem is never disposed at the surface of the growing apex. It is buried in the tissues of the conical apex; root-cap cells, which are vacuolating and no longer dividing, form the actual point. The meristem cells form usually a lens-shaped mass, which terminates a cylindrical inner portion of the root down which the food supplies move (fig. 2).

Evidently the little mass of meristematic tissue grows more rapidly at its inner surface, and as a consequence most cells are added by growth and division at the inner surface of the meristem, and contribute to the extension in length of the root. Relatively few cells are added to the outer surface; the result is that the root cap is only maintained in size as fast as it wears away at the surface, and no superficial folds of meristem are formed as the initials of new lateral organs.

These differences of distribution, always characteristic of shoot and root growing-points, are evidently of considerable significance. Possibly they are due in part to differences in the environment in which these opposed growing regions normally develop, but everyday experience rejects the assumption that a root can be changed to a shoot by allowing the apex to develop in light and air, and though a shoot may be profoundly modified by growth in darkness it still is not thereby converted into a root. This difference must lie either in the meristems themselves or in their food supply. In the seedling the food supply of both is probably the same, as it is derived from the seed reserves, and this assumption is supported by the fact that if the shoot is cut off the root of the seedling grows even faster.\* In so far as the difference lies in the metabolism of the meristem it as yet eludes analysis, but observation has shown that chemical differences can be traced in the walls of the meristem cells and the neighbouring vacuolated cells, which are themselves the products of the metabolism of these meristems.† Briefly, these differences may be summarized as follows. The walls in the root apex contain more protein and fatty substance relatively and less cellulose and pectin, whilst the walls of the shoot apex contain more cellulose and pectin, that is to say more carbohydrates.

Now this chemical difference may have considerable bearing upon the differences in distribution of the meristems, as will appear immediately the problem of their food supply is considered. The meristems must be kept continuously supplied with the raw materials from which to effect their complex metabolic syntheses. For our own growth raw materials are thought of in terms of beefsteak, potatoes, butter, etc., and chemical analysis reconverts these into proteins, carbohydrates, fats, plus inorganic salts, accessory food substances or vitamins, etc.

\* PEARSALL, W. H., "Growth Studies," IV. *Annals of Botany*, 1923, pp. 261-275.

† TUPPER-CAREY, R. M., and PRIESTLEY, J. H., *Proc. Roy. Soc.*, xciv. B, 1923, pp. 109-131.

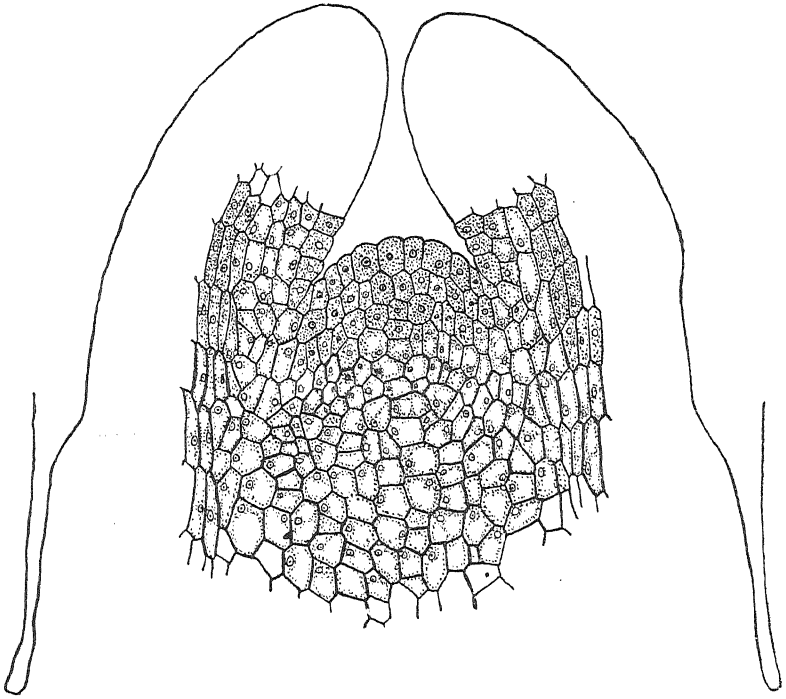


FIG. 1.—GROWING-POINT OF *VINCA MINOR* IN LONGITUDINAL SECTION.

Meristem cells (stippled to centre of cell) cover the apex of the shoot and the lateral folds which form youngest pair of leaves.

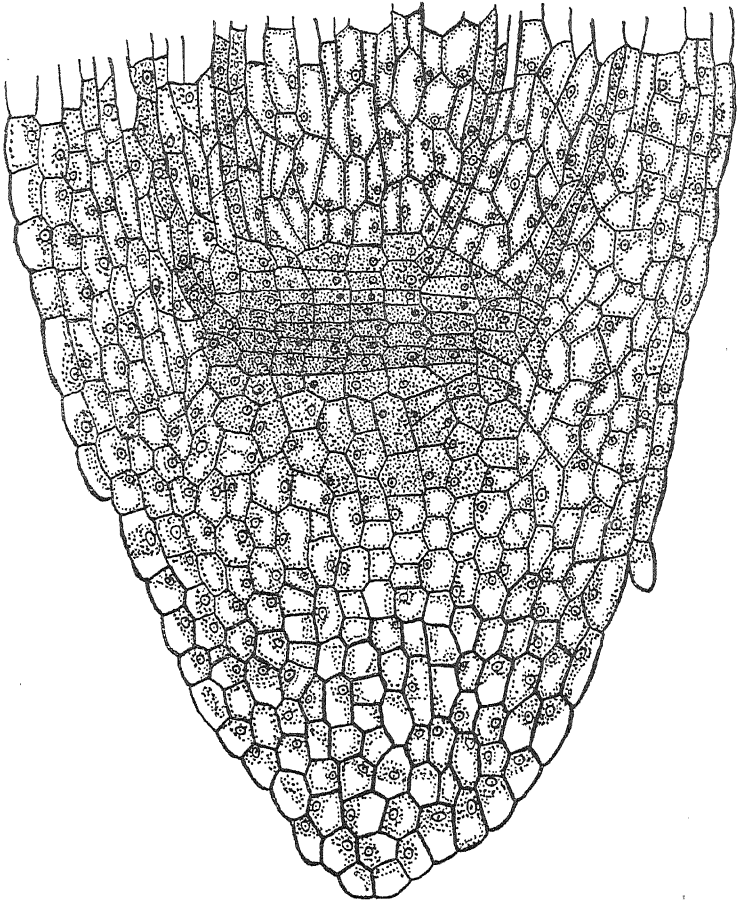


FIG. 2.—GROWING-POINT OF BROAD BEAN.

Meristem cells (stippled to centre of cell) lie sunk in the tissue. The root-cap cells outside these are vacuolated.

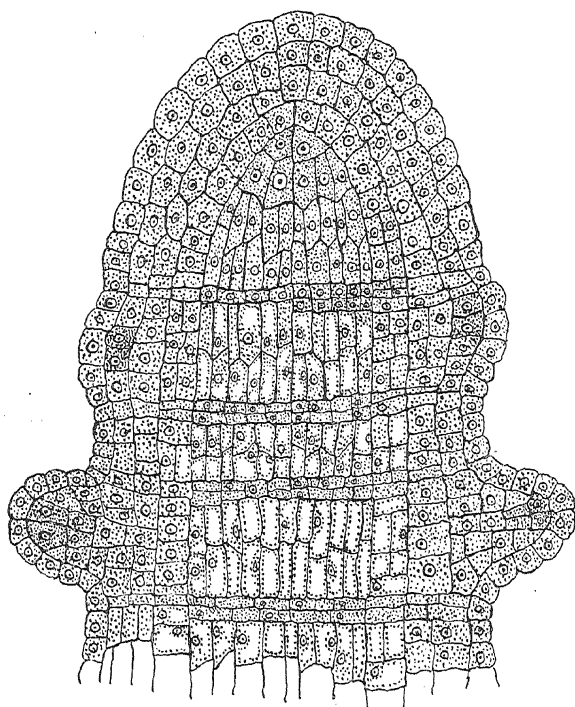


FIG. 3.—GROWING-POINT OF SHOOT OF WATER PLANT, *HIPPURIS VULGARIS*.  
Young leaf initial not curved over tip of the apex.

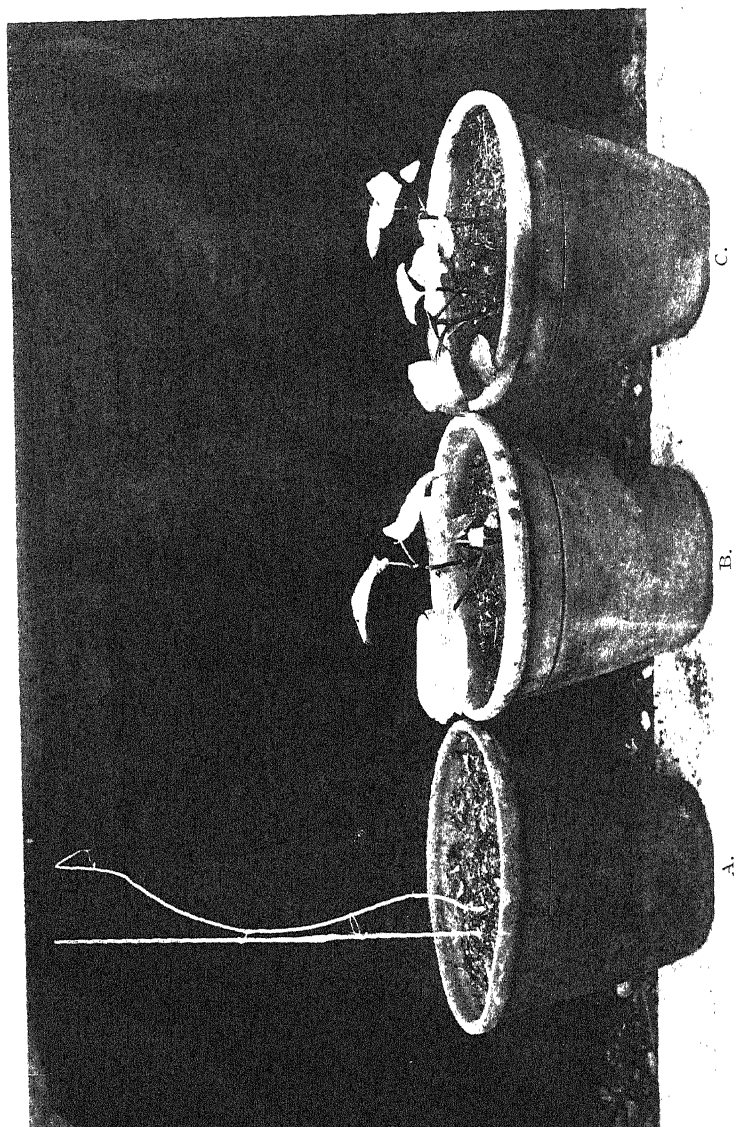


FIG. 4.—EFFECT OF LIGHT ON GROWTH.

A. In complete darkness.

B. Exposed to light 2 hours daily.

C. Exposed to light 5 hours daily.

In the case of the plant meristem, its requirements are undoubtedly simpler, but very little is known as to their exact nature. A list of the substances found by WORMALL\* in the sap collected from vines cut down in the spring may be of use. This sap normally would have supplied the buds in their vigorous spring growth, and there is no reason to think its chemical nature would be materially altered before it reached the bud.

QUANTITIES OF SUBSTANCES FOUND IN SAP OF  
BLEEDING VINES.

	<i>Amount in grams per litre.</i>				
Ash (inorganic salts) .. .. .	0	5	6		
Total solid .. .. .	1	5	6		
Phosphate .. .. .	0	0	3	2	
Reducing sugars (glucose and fructose) ..	0	3	3		
Cane sugar .. .. .	0	0	0	8	
Inorganic nitrogen .. .. .	0	0	2	3	
Organic nitrogen .. .. .	merest	trace			
Organic acids (oxalic, tartaric, malic and succinic) .. .. .	0	5	6		

These substances move towards the meristems along channels in the plant that may be spoken of as vascular channels, although we are still woefully ignorant as to exactly where and how movement takes place within the vascular strand. But in any case this vascular strand terminates some little distance away from the meristem, and the nutrient sap, which must reach the meristem if growth is to continue, has to find its way from the end of the vascular channel across the intervening vacuolated tissue (fig. 1). There are two alternative channels for the sap: it may travel along the walls or through the protoplasts. Water alone might diffuse there by either route, but the solutes enumerated above, especially the sugar and organic acids, will *not* diffuse readily across protoplasts. All physiological experience supports this statement. Furthermore, when moving along walls they may be expected to diffuse more readily through carbohydrates and less readily through walls rich in protein and fatty substances. The superficial distribution of the meristem of the shoot may, therefore, be understood, because the walls which intervene between meristem and vascular supply are mainly of carbohydrate, and when this carbohydrate wall is full of water the nutrient food substances diffuse through them freely to the meristem. On the other hand, the root meristem may grow more rapidly upon its internal surface and not so freely superficially, because only at the inner surface can it obtain the necessary food supplies for its metabolism, as these diffuse so slowly from the vascular strand through walls rich in protein and fat.†

Thus the conditions required for normal growth are those which

\* WORMALL, ARTHUR, *Biochemical Journal*, xviii. 1924, pp. 1187-1202.

† PRIESTLEY, J. H., and TUPPER-CAREY, R. M., "Physiological Studies in Plant Anatomy," IV., *New Phytologist*, xxi. 1922, pp. 210-229.

maintain the normal meristematic activity at the apical growth centres, and include the supply of nutrient substances from the vascular system, and these conditions differ at the apices of shoot and root.

These conclusions may now be applied tentatively to see if they throw any light upon the effect of external conditions upon the growth of shoot and root. In the case of the root with its deep-sunk meristem, which caps the cylinder of tissue along which the nutrient sap moves, it is readily understood that external conditions such as light or darkness have little influence upon meristem activity, and therefore, upon the form and structure of the root system it produces. On the other hand, in the case of the upward growing shoot, the superficial meristem is separated from the vascular supply by a zone of vacuolated tissue beneath it, so that a positive drive of sap from the vessels of the vascular supply is necessary to saturate the walls of this intervening tissue with water and thus permit the free diffusion of nutrient substances to the meristem.

The meristem cells themselves have little tendency to take up water. This characteristic is probably essential to the proper performance of their chemical function, which involves rapid and continuous complex syntheses which are of the general type  $A + B \rightleftharpoons C + H_2O$ . Here A and B represent relatively simple substances which combine to give rise to the complex substance C, a process accompanied by the elimination of water. As the arrows suggest, the reaction might go either way, and, if water is abundant, C in presence of water will tend to reform A and B. But obviously water does not accumulate in the meristematic protoplast, and the chemical change proceeds in the direction of synthesis.

For reasons discussed elsewhere,\* it is concluded that the water thus freed in the meristematic cell is probably absorbed from it by the osmotic action of neighbouring vacuolated cells.

When the vessels in the vascular system which terminate below these vacuolated cells contain sap under positive pressure, it will diffuse freely from these vessels along the walls of these vacuolated cells to the meristem, all these walls being mainly carbohydrate and readily permeable both to water and the substances dissolved in it. The meristem cells can thus obtain their solutes, but directly the sap in the vessels is no longer under positive pressure and ceases to flow along the walls—a state of affairs easily reached when a leafy plant is evaporating water on a sunny day—then the water in the walls is also rapidly withdrawn by the osmotic suction of the vacuolating cells. These carbohydrate walls are usually said to hold water by “imbibition,” a name which cloaks ignorance and covers many processes. It is better to say that the wall retains water much as a jelly does, and most of the water in a jelly will evaporate in dry air, and could be absorbed from it by the osmotic attraction of a vacuolating

\* PEARSALL, W. H., and PRIESTLEY, J. H., *New Phytologist*, xxii. 1923, pp. 185-191.



cell. It is true there is a minimal quantity of water which is held much more firmly, and which the physical chemist calls the adsorbed water; this is indicated by the fact that dry cellulose walls in relatively dry air will gain in weight because they take up water from the air. This adsorbed water the vacuolated cells cannot withdraw, but when the walls contain only this amount of water there would be little or no diffusion of solutes possible from the vascular system across these walls to the meristem. And without the continuous supply of solutes there cannot be continued meristematic growth. These conclusions as to the relative dryness of the walls between vascular strand and meristem, when the vascular supply contains sap under less than atmospheric pressure, seem justified to the writer, but they still lack direct experimental verification.

They are mentioned because they supply a possible reason for a well-known horticultural phenomenon—the cessation of growth during a hot, dry day and its renewal again after some hours of darkness, when absorption by the root system has overtaken the loss of water by transpiration during the day. BALLS\* reports this phenomenon for the cotton plant in Egypt; it may often be noted by the grower in this country. The same considerations may explain the effect of wind in cutting off the supply of nutrient to the meristem of buds exposed to drying winds which blow constantly in one direction, and thus profoundly modify the growth habit of perennial shrubs and trees.

It has also been shown that growth of the shoot in darkness may affect the nutrition of the meristem, because when the shoot meristem develops in the dark the fatty substances released from the dividing meristem cells stay on the walls between these cells instead of moving outwards and contributing to the cuticle.† The result is a thinner cuticle at the surface, and walls interposed between meristem and vascular supply which impede the free diffusion of food to the meristem. The growth of the superficial layer of meristem is thus diminished, lateral folds are not formed, and new leaf initials do not separate from the apex. Growth proceeds, but mainly consists in elongation of the stem by the formation of new cells which vacuolate and separate from the basal rim of the superficial envelope of meristem. Thus is obtained the etiolated shoot with but small development of a few lateral leaf initials ‡ (fig. 4).

The shoot meristem, which develops in the dark, thus shares to some extent the characteristics normal to the development of the root meristem, and it may be of interest to point out that this analogy even holds so far as to include one common structural feature. In the root the fatty substances are also slow to move from the walls of the vacuolating cell, and they never reach the surface and deposit upon

\* BALLS, W. L., *The Cotton Plant in Egypt*, London, 1919, pp. 26–27.

† TUPPER-CAREY, R. M., and PRIESTLEY, J. H., *Proc. Roy. Soc.* xcv. B, 1923, pp. 109–131.

‡ PRIESTLEY, J. H., and EWING, J., "Physiological Studies in Plant Anatomy," VI., *New Phytologist*, xxii. 1923, pp. 30–44.

it as a continuous layer of cuticle.\* Air is able to percolate inwards through intercellular spaces as far as the inner limit of the cortex, and unsaturated fatty substances in the walls of the layer next within, thus brought in contact with air, oxidize and change in nature and form a stiff, varnish-like substance, just as such vegetable oils would do if extracted from the plant and left in a thin film exposed to air. Thus in this cylinder of cells, just within the cortex and known now as the endodermis, around each cell of the cylinder on its longitudinal radial and transverse walls where the fatty substances meet the air, a rigid layer of varnish forms (fig. 5). When these fatty substances oxidize and set they are intimately mixed with proteins which are in continuity with the living protoplasts. As a result the endodermis becomes in effect a chimney, one brick thick, in which the bricks are living protoplasm and the mortar a strip of varnish (the Casparian strip).

Between "bricks" and "mortar" no crevice is left. Thus all the inner system of the root, which includes all the vascular supply, is enclosed in a cylinder of protoplasm which fills the meshes in a network of varnish. The result is that though the sap supplies in the root may leak through permeable walls as far as the endodermis, the organic supplies in this sap—the nutrients of meristematic growth—can diffuse outwards no farther.†

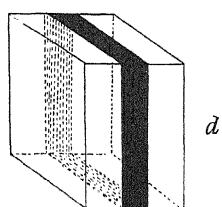
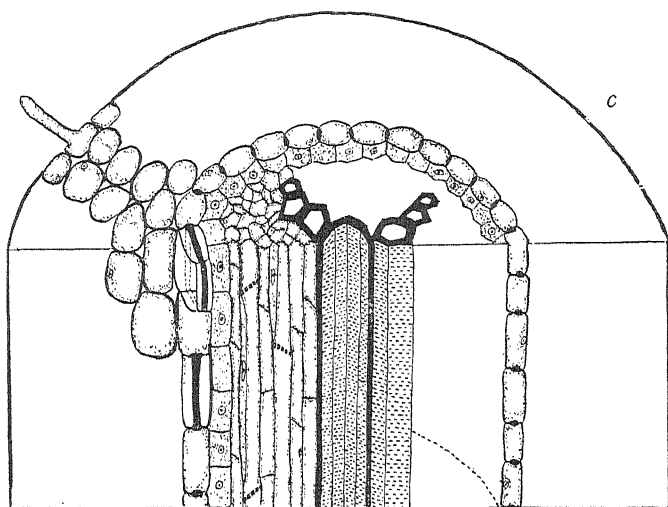
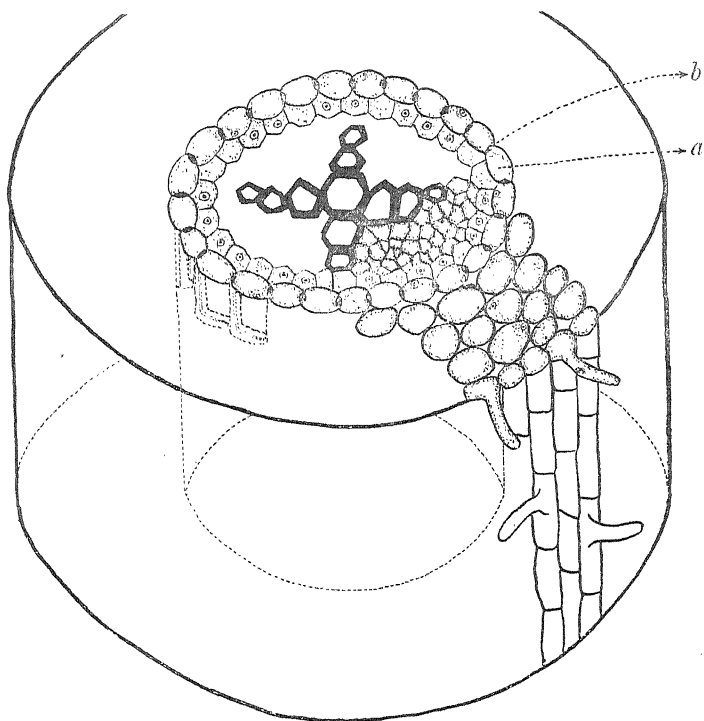
Here we find the reason why, when new roots appear upon the parent root, they spring from within. The initial meristem cells must be within the endodermis or they will be cut off from the nutrient sap.‡ From the present standpoint the exogenous origin of leaves and branches upon a shoot and the endogenous origin of branch roots thus seem to follow naturally upon the earlier differences between the meristem of shoot and root.

Now in the case of the etiolated shoot it was pointed out that fatty substances also lingered upon the interior walls. It is very interesting to find that in many species of plants, as, for instance, the broad bean, the pea and potato, the shoot apex, which develops in darkness, lays down a similar cylinder of endodermis. When these plants are grown in the light, in its place is found a cylinder of starch containing cells without Casparian strip, the starch sheath. This replacement of starch sheath by endodermis is associated with other changes in development which are readily interpreted as due to the relative activity of the superficial meristem. To take as an example the potato, the normal potato haulm in light is flanked by three wing-like expansions. In the etiolated plant these are quite absent from the stem, which is almost round in cross section. This subject is full of intriguing possibilities. In the potato the typical tuber-bearing stolon can only be formed in the dark. It is round in cross section and contains a

\* LEE, BEATRICE, and PRIESTLEY, J. H., *Annals of Botany*, xxxviii. 1924, pp. 525-545.

† PRIESTLEY, J. H., and NORTH, EDITH, "Physiological Studies in Plant Anatomy," III., *New Phytologist*, xxi. 1922, pp. 113-139.

‡ PRIESTLEY, J. H., and PEARSALL, W. H., "Growth Studies," II., *Annals of Botany*, xxxvi. 1922, pp. 239-249.



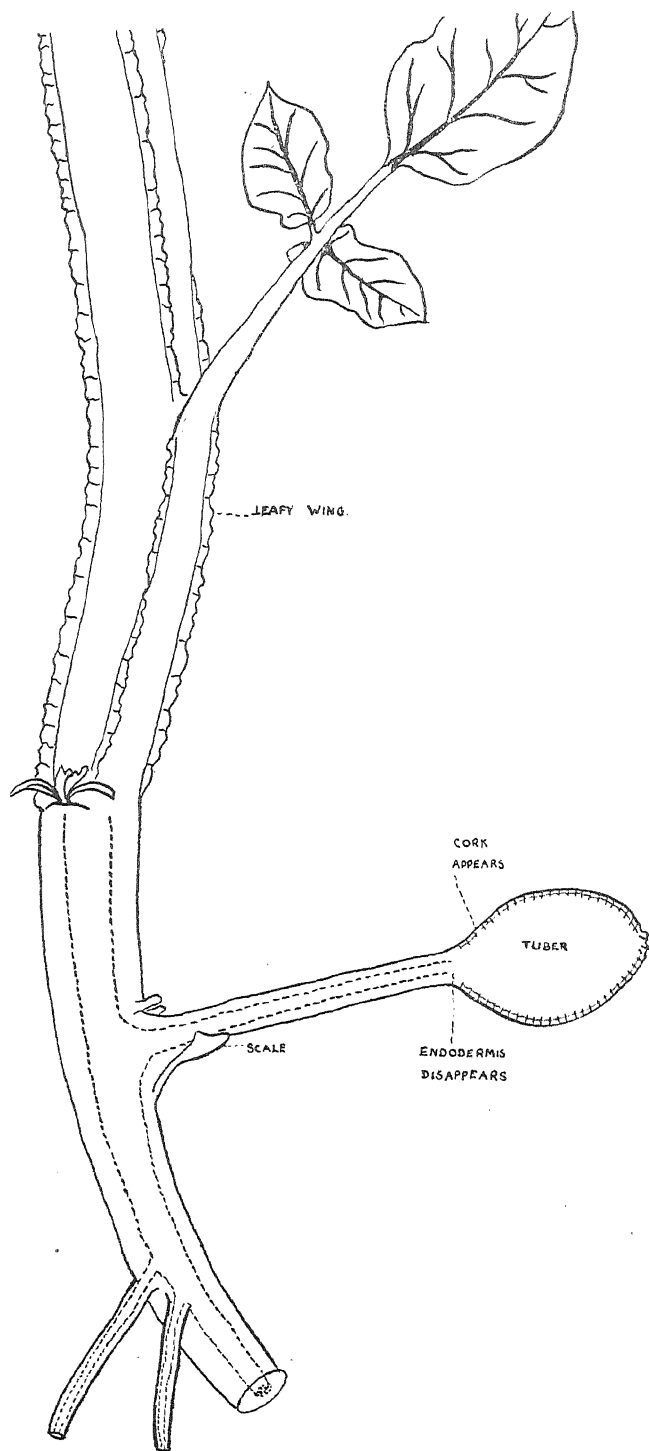


FIG. 6.—DIAGRAM OF BASE OF POTATO SHOOT.

The cylindrical underground stem and also the stolon have an endodermis, but this appears below the region where the shoot develops leafy angles and before the tuber develops on stolon.

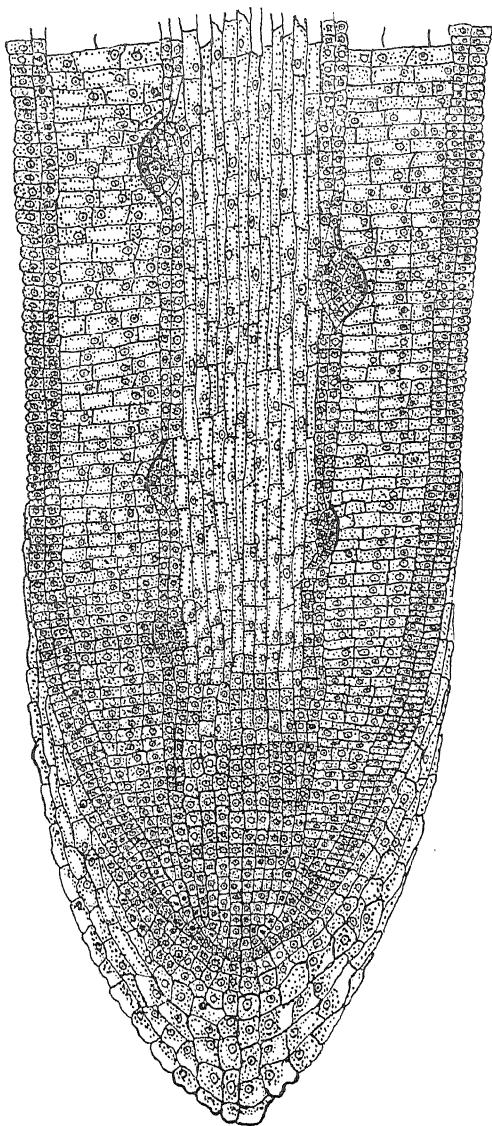


FIG. 7.—ROOT OF ARUM LILY IN LONGITUDINAL SECTION.  
Showing young branch root initials just within the future endodermis. These remain meristematic when the other cells of the pericycle vacuolate.

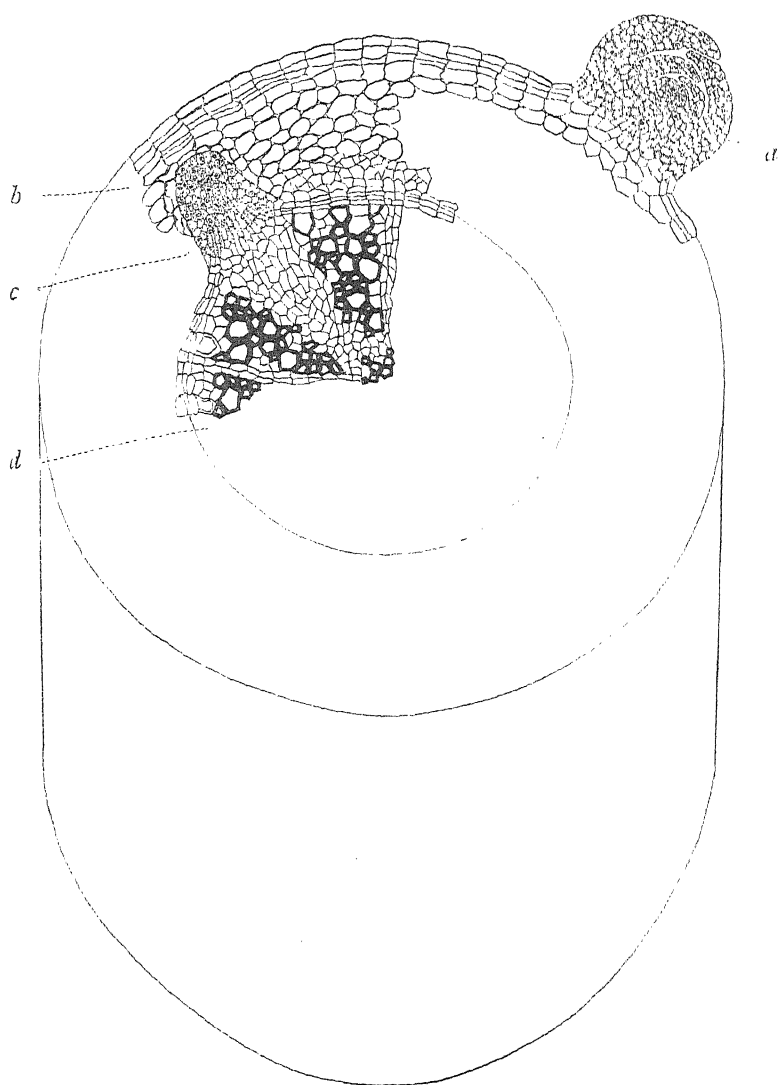


FIG. 8.—DIAGRAM OF STRUCTURE OF DICOTYLEDONOUS SHOOT IN SECTION.

Origin of (a) bud from (b) cork cambium (phellogen) and of (c) root from (d) vascular cambium.

[To face p. 9.]

typical endodermis, but when tuber formation begins the endodermal cylinder with Casparian strip fails to form behind the developing meristem (fig. 6).

#### VEGETATIVE PROPAGATION IN TERMS OF GROWTH.

The problems of vegetative propagation can now be restated in terms derived from this preliminary study of normal growth. Vegetative propagation is a process by which a piece taken from a growing plant reforms a fully balanced root and shoot system. Successful propagation, therefore, depends upon the capacity of the piece cut from the plant, first of all to heal, thus remaining resistant to disease, secondly to regenerate the missing meristems until the two growth centres of shoot and root are once more in harmonious co-operation. Healing is a problem in itself and has been discussed elsewhere,\* but the problem of re-establishment of a balanced normal plant from a severed piece raises the following considerations :

- (1) Are there meristematic cells in the piece of plant taken ?
- (2) If not, can ordinary living vacuolated cells again become meristematic ?
- (3) Is there a supply of nutrient sap available to maintain the new meristematic centres in activity, and, if so, how does it reach them ?

These are certainly primary questions in the effort to establish principles in vegetative propagation. The attempt to answer the first one seems to throw considerable light upon horticultural experience.

#### *The Distribution of Meristematic Cells throughout the Plant.*

As cells vacuolate behind the growing-points, groups of meristematic cells are often left amongst them, their grouping and arrangement being characteristic in the different plants. In the shoot such groups of meristem are always found in the axils of the leaves, forming the axillary buds, but in addition meristematic tissue is usually distributed all round the region of the node, whilst in the adult stem it may practically disappear from the internode.

*The Monocotyledon.*—This is particularly true of the Monocot type. The leaf continues growth by a meristem situated at its base, whilst the rest of the permanently meristematic tissue is found in the axillary bud and distributed throughout the node. The meristematic tissue within the node frequently develops root initials, as in *Tradescantia fluminensis*, which may lie dormant until external conditions such as are utilized in vegetative propagation start them into activity.† These structural features of the Monocotyledon go far to explain certain

\* PRIESTLEY, J. H., and WOFFENDEN, LETTICE M., *New Phytologist*, xxi. 1922, pp. 252-268; and *Annals of App. Biology*, x. 1923, pp. 1-20. HERKLOTZ, G. A. C., *New Phytologist*, xxiii. 1924, pp. 240-255.

† SCOTT, LORNA I., and PRIESTLEY, J. H., *Journal of the Linnean Soc.*, xlvii. 1925, pp. 1-28.

of their characteristics under conditions of vegetative propagation, viz., (1) the way in which buds develop from basal nodes when shoots are used as cuttings,\* (2) the fact that in the rare cases where leaves can be used for propagation (e.g. *Sansevieria*) the new bud arises from the base of the leaf, (3) that rooting of cut shoots is frequently confined to the nodes. The behaviour of Monocot cuttings in rooting is more fully discussed by SCHUBERT †; space will not permit a fuller analysis of his data, but they seem to be in accordance with the known facts as to the distribution of the meristem in these plants.

In the Monocot root system, as in most root systems, new growths, whether roots or buds, must spring from the pericycle, the layer just within the endodermis. As already pointed out, root initials may lie latent in this pericycle as groups of meristematic cells in a layer in which all other cells are vacuolated (fig. 7).

A very interesting problem in the case of the Monocotyledon is the question whether vacuolated tissue can return to the non-vacuolated meristematic condition. This certainly happens in certain Liliaceae, e.g. *Yucca* and *Dracaena*, where a cambium is present in root and stem, whilst a peculiar and limited form of cork formation,‡ which slowly takes place below slowly wounded surfaces, suggests that it may happen elsewhere. In some roots also, especially after injury, new branch roots arise, apparently from vacuolated cells in the pericycle. On the other hand no experimental treatment will produce branch roots upon the roots of *Hyacinth*; and in general the limitations of the methods of vegetative propagation amongst Monocotyledons are readily understood if the assumption is made that as a general rule new buds and new roots only arise from pre-existing meristematic tissue. This assumption, for instance, would explain the striking fact that, apart from *Dracaena*, there are practically no examples of propagation from roots recorded for the group.

*The Dicotyledon.*—In the Dicotyledon the problem of vegetative propagation is altogether different, for between the opposing polar meristems is found, practically from the beginning, a thin cylinder of meristematic tissue which separates the two main constituents of the vascular system, the xylem within and the phloem without. Later, another cylinder of meristem frequently appears farther outside, in the cortex, or just below the epidermis.

These two cylinders of meristematic tissue continue to cut off new cells, the inner vascular cambium mainly to the inside, the outer cork cambium or “phellogen” mainly to the outside.

This suggests the difference between the two polar meristems, with new cells forming superficially in the shoot and at the inner margin of the meristem tissue in the root. It is, therefore, of very great interest that an extended study of propagation in the Dicotyledon leads to the generalization that the vascular cambium gives rise to root initials only,

\* BAYLEY BALFOUR, I., *Jour. Roy. Hort. Soc.*, 38, 1913, pp. 447-460.

† SCHUBERT, O., *Ber. der Königl. Lehranstalt für Wein-, Obst-, und Gartenbau zu Geisenheim-am-Rh.*, 1913, pp. 114-119.

‡ PHILIPP, MARIA, *Bibliotheca Botanica*, 1924, Heft 92, pp. 1-28.



and the phellogen to new shoot initials (fig. 8). This statement, if true, is obviously of the utmost importance to the understanding of vegetative propagation, and deserves the most rigorous scrutiny before it is accepted. All that can now be done is to illustrate it by means of a few selected examples.

*Roots from the Vascular Cambium.*

The formation of root initials upon the vascular cambium can be beautifully seen in willow shoots (fig. 9) where, as VOCHTING\* first pointed out, they are present as latent root growing-points in the normal shoot. Such latent root initials are also found in other trees, sometimes keeping pace with the development of the annual ring of wood for many years,† sometimes exceeding the rate of growth of the cambium and thus giving rise to the nodular excrescences found on some woody stems, and which are usually clustered most thickly around old leaf scars. Trees which show these outgrowths are always easily propagated by striking shoots, as roots grow out readily from these nodular excrescences.

In other plants no such latent initials are present, but under special conditions, as at the rooting apex of the blackberry, they will form also from the cambium (figs. 10a and 10b). When, therefore, a Dicotyledon shoot is used as a cutting, successful propagation depends upon the production of new roots from the cambium. This restatement of the problem unfortunately does not provide a simple key to the behaviour of different Dicot shoots. As the cambium is continuous through node and internode, it explains the fact that, with many Dicotyledons, cuttings with a long strip of internode below the last node can propagate successfully. Failure to propagate from the node, as shown by Clematis, may be explained by other structural features of the node, which prevent root initials from growing out through the cortex.‡

The new roots upon the cutting may strike out through the cortical tissues and issue laterally, but in many plants they grow out through the pad of callus which covers the cut end of the shoot. They still arise, however, from the vascular cambium, and as the layer active in callus formation is the phellogen and not the vascular cambium this throws considerable light upon the antithesis between callus formation and root production to which BAYLEY BALFOUR drew attention.§ For when the callus is pared down its growth will be reduced and the food supply it draws upon left available for the vascular cambium within, which grows more actively, with, as a result, the production of root initials.

BAYLEY BALFOUR expresses the view that *any* plant could be successfully propagated vegetatively, and certainly from the success of

\* VOCHTING, H., *Über Organbildung in Pflanzenreich*, Bonn, I. 1878 ; II. 1884.

† BORTHWICK, A. W., *Notes from Royal Bot. Gard. Edin.*, xvi. 1905, pp. 15-36.

‡ SMITH, EDITH, *Trans. and Proc. of Bot. Soc. Edin.*, vol. xxix. 1924, pp. 17-26.

§ BAYLEY BALFOUR, *loc. cit.*, p. 453.

L. B. STEWART at Edinburgh in propagation it would seem that in his hands any severed shoot system would produce roots. At the same time these shoots can be placed in relative order as to the ease with which they give rise to roots, and the time-honoured practice of grafting apple and plum scions upon more easily rooting stocks is an admission that some shoots are difficult to root. In Germany and America the same difficulty in rooting apple scions has been encountered as has been met with in the experimental fruit stations at Long Ashton and East Malling in this country. Unfortunately, the new standpoint does not explain the difficulty, but it may be suggested that the behaviour of the cambium deserves investigation in the case of shoots which are difficult to root.

When new roots arise upon roots in the Dicotyledon they usually appear before the cambium has formed a continuous layer within the vascular cylinder. The root initials then arise in the pericycle, the layer just within the endodermis opposite to the xylem vessels, where later the vascular cambium itself originates.

Examples have been seen, however, of the later development of roots upon older roots, and these are always formed from the vascular cambium.

#### *The Food Supply to New Roots.*

In all cases, in addition to the meristematic cell of the vascular cambium, another factor in the development of root initials must be the food supply for their growth. In certain cases this factor largely controls the production of the new root initials. In the root leakage of sap from the vascular system is prevented by the endodermis; in the shoot this is not so, and the formation of roots from the vascular cambium may not take place because the available food supply is utilized instead by superficial meristems such as cork phellogen and axillary buds. In some etiolated shoots, however, an endodermis forms, as was pointed out on page 8; in this case the nutrient sap is restricted within the endodermis, superficial meristems make but little growth, but such etiolated shoots root with extraordinary ease and in moist air roots grow out from the shoot far above the ground level.\* An unsuccessful attempt was made to develop roots upon apple scions by growing the shoots of these scions in darkness, but no endodermis forms in these shoots when etiolated. Camphor shoots have been rooted successfully at Edinburgh after previous etiolation,† but this is due, not to the formation of an endodermis, but to the great reduction in hard, fibrous tissue in the cortex. The same explanation probably holds for the successful effect of earthing up young shoots when propagating apple or plum stocks by layering or by stool shoots from the cut-back stock. The presence of the endodermis is certainly associated with the free rooting of underground stems or stolons, and of the stems of submerged water plants, whilst the effect of light in

\* PRIESTLEY, J. H., and EWING, J., *New Phytologist*, xxii. 1923, pp. 30-44.

† REID, OONA, *Trans. and Proc. Bot. Soc. Edin.*, xxvii. 1922-3, pp. 184-188.

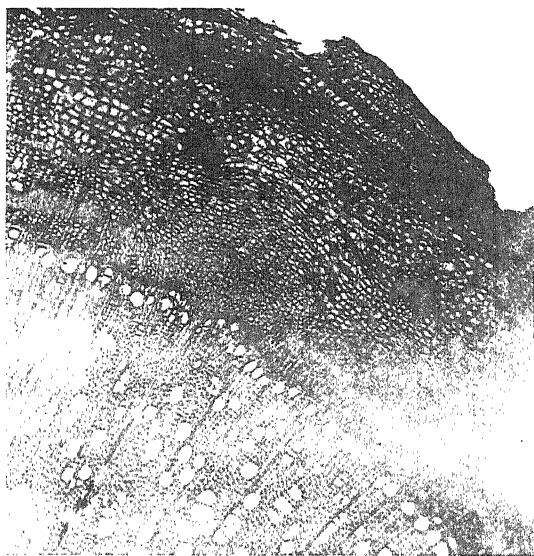


FIG. 9.—SECTION OF STEM OF *SALIX FRAGILIS*.  
A root initial can be seen opposite a black line of medullary rays. Here the black patches of fibres in the phloem are interrupted.

[To face p. 12.



FIG. 10A.—SECTION OF ROOTING RUNNER OF *RUBUS LEUCOSTACHYS*.  
A dark patch of meristem forming a root initial is in line with the vascular bundle.

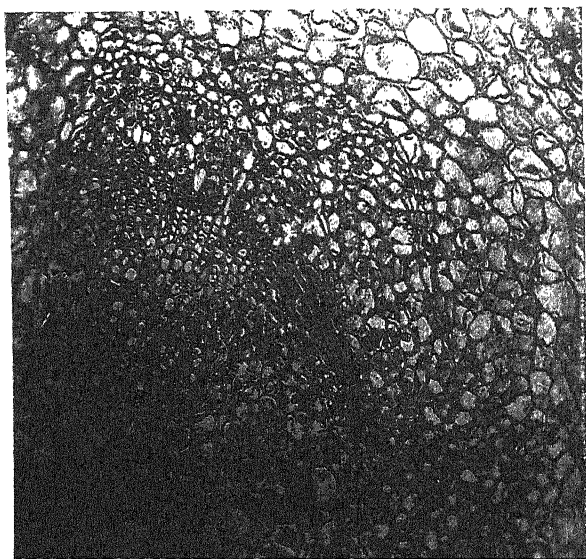


FIG. 10B.—SECTION OF ROOTING RUNNER OF *RUBUS LEUCOSTACHYS*.  
The patch of meristem is seen to be in line with the cambium of the vascular bundle on the left.

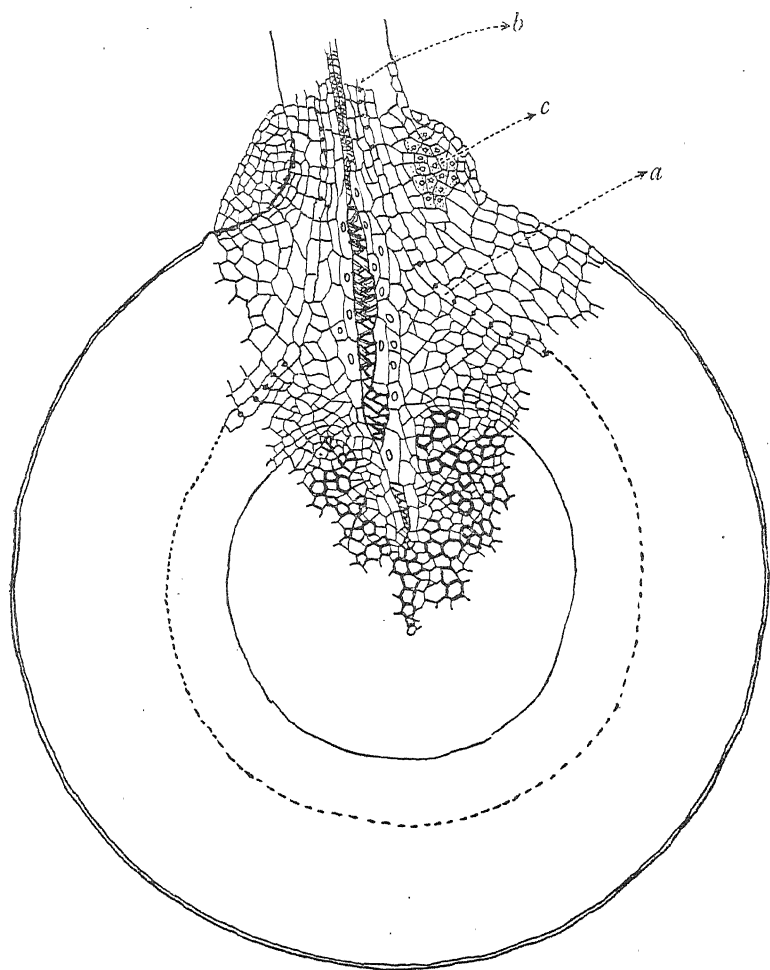


FIG. 11.—DIAGRAM OF ROOT SECTION WHERE BRANCH ROOT ARISES.  
A bud initial (*c*) is forming opposite the gap between the endodermis of the main root (*a*) and the branch root (*b*).

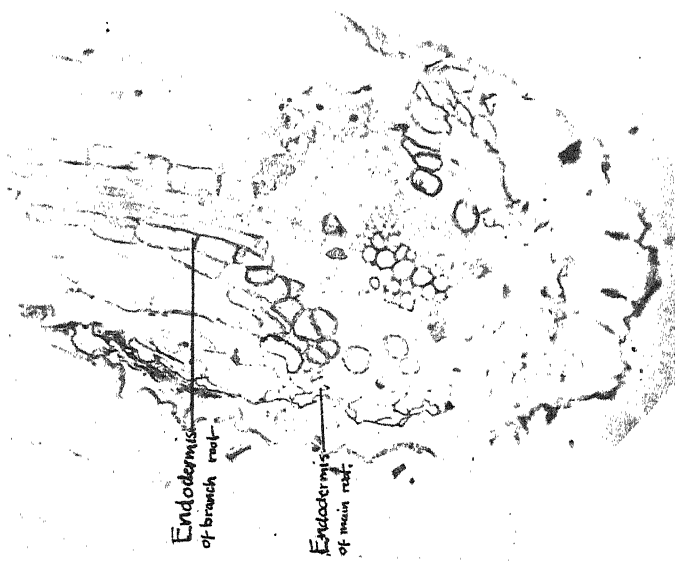


FIG. 12.—SECTION OF ROOT OF PELARGONIUM.  
 Showing origin of root; cells with fat in walls black.  
 Crushed cells of endodermis of main root joined to  
 large cells of endodermis of branch by a group of cells  
 with fat in walls.

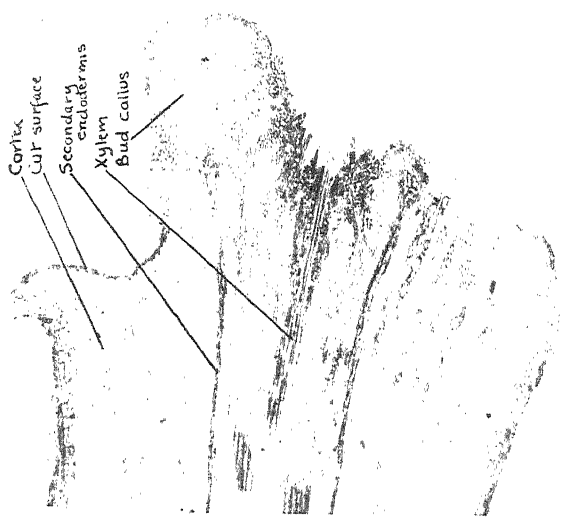


FIG. 13.—LONGITUDINAL SECTION OF ROOT OF  
 SPIRAEA ULMARIA.

Buds arising from callus at cut surface.  
 N.B.—Callus arises from tissues just within  
 the endodermis.  
 [To face p. 13.]

preventing free rooting upon shoots is also illustrated by the production of roots upon the shaded side of the young ivy stem.

Another effect of food supply is indicated by ringing experiments, or experiments in which the phloem is just interrupted by a notch. In either case new root initials tend always to arise from the vascular cambium, above the place where the phloem is interrupted.

*Shoots from the Phellogen or Cork Cambium.*

A shoot upon a shoot system usually arises from a pre-existing bud initial, but if this be absent buds may frequently arise from the callus over the cut surface, especially from the top or distal callus. When the origin of these buds is followed, as in SIMON's experiments,\* the buds arise from a cork phellogen lying at or close to the surface of the callus; only later is this meristematic tissue put in contact with the vascular system by the development of tracheids in the underlying parenchyma. In the laboratory at Leeds considerable attention has been paid to the origin of buds upon isolated root systems. In Dicotyledons such buds frequently occur, and therefore vegetative propagation from pieces of root is possible. As BEIJERINCK† pointed out, this power is not possessed by all Dicotyledons; in whole natural families, such as Caprifoliaceae, Crassulaceae, etc., no species are known in which propagation from root segments is possible. After the vascular cambium of the root has been formed in the Dicotyledon a cork phellogen frequently arises also, usually in the pericycle. In the rare cases where this phellogen originates in the cortex this can be traced to a leakage of the nutrient sap through the endodermis.‡ When this cork phellogen is present a bud, if formed, is always initiated in contact with it.

It is frequently assumed that such buds will arise anywhere upon the root, but this is far from true. In many roots the buds are normally present prior to the separation of a portion of the root system for propagation, and in such cases they are almost invariably situated at the base of a branch root or over the former place of insertion of a branch root. When buds arise laterally as the result of the separation of the root for propagation purposes they usually arise in the same position. Anatomical investigation immediately explains the reason for this position.

Where the branch root arises there is frequently a *gap* between the endodermis of the primary root, which is broken through here by the emergence of this branch root, and the endodermis of this branch root itself (fig. 11). At this gap, cork or callus-like tissues arise in the cortex, forming a cushion-like outgrowth, above or below, or at the sides of the branch root or in a ring round it. From the phellogen in this cushion develop later the bud initials. This not only explains the position of the lateral buds when present but also their absence upon

\* SIMON, S., *Jahrb. für wiss. Bot.*, xlv. 1908, pp. 351-478.

† BEIJERINCK, M. W., *Verzamelde Geschriften*, Delft, 1921, vol. ii.

‡ PRIESTLEY, J. H., and WOFFENDEN, L. M., *New Phytologist*, xxi. 1922, pp. 252-268.

many roots, and their failure to form when attempts are made to propagate from the root system.

In many roots the endodermis of the parent root and of the branch forms a continuous system (fig. 12), no leakage of sap to the original cortex takes place, cork development occurs within the endodermis, and this cork forms a smooth, unbroken layer from branch root to parent root. In some roots cork formation within the endodermis is so vigorous and long continued that it breaks through, disrupts the endodermis and becomes the superficial layer of the root. Upon such a cork phellogen, as in *Thladianthus dubia*, buds may develop quite independently of the position of the lateral roots.

Frequently isolated root pieces, which fail to produce lateral buds, give rise to buds upon the callus at the cut surface (fig. 13). Such buds are usually formed at the proximal cut surface (the end nearest to the stem from which the root has been removed), but in *Verbascum* they appear at either end, and in *Silene fimbriata* are usually upon the distal surface. Here, again, microscopic examination has shown that the buds arise from the superficial phellogen active near the cut surface.

#### *The Origin of New Meristematic Cells.*

The fact that shoot and root initials can be traced to the two cambiums in the Dicotyledon itself answers the second query on page 9. In the case of both the vascular cambium and the cork phellogen it is definitely known that many of the meristematic cells were originally derived from previously vacuolated cells. Obviously, then, bud and root initials may similarly do so, as, for instance, in the case of propagation from a *Begonia* leaf, where bud initials arise from one or more epidermal cells and root initials from a few cells in the neighbourhood of the vascular cambium of the vein.\* This question of the reappearance of meristematic characters in the vacuolated cell has recently been re-examined.† The details of this work are somewhat too technical for discussion here, but the question must be briefly reviewed, as it leads into the heart of the present problem.

A return to meristematic condition in the vacuolated cell means an increase in protoplasm and a loss of water.

These processes have been studied in progress in the cells near the cut surface of a potato tuber. These studies have led to a comparison between the loss of water from the proteins of the protoplasm and the conditions under which such proteins either separate out from water or, as protein gels, lose water and shrink. Proteins are very sensitive to the acidity or alkalinity of the solution in which they lie. It is possible to establish a scale of such acidity much as the temperature recorded in degrees provides a scale by which to express the amount of heat in the environment. If the behaviour of these proteins is studied in reference to such a scale there will be found to be one point on the scale at which most water is lost, or precipitation occurs most readily. It is

\* REGEL, FRITZ, *Jena Zeitschr. für Med. und Naturw.* x. 1876, pp. 447-492.

† PEARSALL, W. H., and PRIESTLEY, J. H., *New Phytologist*, xxii. 1923, pp. 185-191. HERKLOTS, G. A. C., *New Phytologist*, xxiii. 1924, pp. 240-255.



therefore very suggestive that the phellogen at the cut surface of the potato is found to lie across a gradient of acidity, the tissues outside it being more acid and those within less acid than the point at which the main proteins of the potato are known to precipitate most readily. Extending this new viewpoint to other sheets of meristematic tissue, the cork phellogen seems generally to lie between a more acid layer without and a less acid within. On the other hand, the phloem is a relatively alkaline tissue, and the xylem relatively acid, so that the vascular cambium lies across a reverse gradient. And these layers give rise to different types of polar meristems!

Although very tempting, it would probably be unwise to push this analysis further at present. It raises, however, the question as to whether these two cambiums and the related polar meristems differ fundamentally in nature or only on account of the differently correlated developmental conditions under which they work. If any vacuolated cell may become a meristematic cell, and if its behaviour then depends upon the gradient of acidity in which it develops, there would appear to be no fundamental difference in the meristematic cells themselves, but only in the circumstances under which they carry on their fundamental metabolic work. In accordance with this fact, cases are recorded in the literature, though they appear to be very rare, where cells of the root apical meristem give rise to a shoot apex, as in *Ophioglossum*,\* and BEIJERINCK (*loc. cit.*) describes conditions under which the shoot initial of lateral buds on the roots of *Rumex Acetosella* are converted into root apices.

### *Polarity.*

It is necessary, even in the present incomplete presentation of the phenomena of vegetative propagation in terms of structural features, to recognize that from this new angle the phenomena under re-examination include those grouped under the term polarity.

When an isolated piece of shoot is utilized in regeneration it is a general rule that the apical region of the piece is more associated with bud development, the basal with root development.

The phenomena of polarity sometimes obviously fit into the anatomical data. Thus VOCHTING points out that young willow shoots show much more well marked polarity than older shoots, which is readily understood, as in the young shoots root initials are not yet formed from the cambium in the upper part of the shoot. Still more generally it may be pointed out that in young shoots the vascular cambium will be better established and more active in the basal portion of the shoot, and it is this cambium which is associated with root production.

A full discussion of polarity, however, is not yet possible, but it is suggested that these phenomena should be re-examined from the standpoint of the distribution of the meristems or of potentially meristematic tissue coupled with the normal gradients of food supply which already exist in a developing plant.

\* GOEBEL, K., *Organography of Plants*, Oxford, 1905, ii. p. 228.

The influence exerted by gravity upon the phenomena of polarity is difficult to interpret when so little is known as to the effect of gravity upon the movement of the food supplies. The production of roots seems particularly influenced by gravity, which many experimental data seem to suggest affects also food movements in the phloem. On the other hand, the shoot meristem appears only to obtain the nutrient supplies when exudation pressures generated in the xylem irrigate the walls of the cells which intervene between vascular system and meristem. The influence of gravity is not likely to be so direct upon such exudation pressures as upon movement in the phloem. Quite a number of observations upon bud formation on roots deserve examination from this point of view. Thus buds are often more readily formed if the root system is left undisturbed in the soil and only the stem cut away. Similarly, in dealing with certain obdurate root systems at the John Innes Horticultural Institution success has been achieved when the shoots were cut off, the root systems uprooted and inverted, and then replanted with the absorptive region of the root again in the soil. In both these cases the maintenance of exudation pressures in the root system has probably aided the nutrition of the bud initials which have developed.

Future conclusions upon the problem of polarity may be anticipated to this extent. The whole tendency of this work is away from the old viewpoint of SACHS, in which polarity was explained as due to descending currents of root-forming materials and ascending currents of shoot-forming materials. On the contrary, the general nature of the food supply to all meristems would seem to be the same, and the meristem cells fundamentally similar also, but the different structure would appear to be associated with different positions of the meristem cells, with, as a consequence, different conditions operating during development and different factors governing food supply. As a result the problem of continuous nutrition is different in shoot and root. In this respect the present findings endorse with some anatomical details the conclusion recently reached by the late JACQUES LOEB\* that the food supply necessary to root and shoot development was identical, but the developing initials ("anlagen") of shoots and roots must be differently situated.

In concluding this brief review of the problems of vegetative propagation from the laboratory standpoint, acknowledgment must be made of the continuous help given by research assistants in the Botanical Department at Leeds. Data obtained by Miss TUPPER-CAREY, Miss L. M. WOFFENDEN, and Miss URSULA TETLEY have continually been utilized to illustrate the points at issue. During the last three years these problems have been almost continually under investigation in the Botanical Department at Leeds, which is particularly indebted to Dr. W. BATESON, F.R.S., and to the John Innes Horticultural Institution both for facilities for experiments upon propagation and for direct financial assistance.

\* LOEB, JACQUES, *Regeneration*, London, 1924.

## ABBOTSWOOD GARDENS.

By MARK FENWICK.

I IMAGINE the only reason why the Editor should have honoured me with an invitation to write a description of my garden is because it represents a different type from the many beautiful ones in Cornwall, Sussex, and West of Scotland, where so many trees, shrubs, and plants can be grown which are quite impossible at Abbotswood. Let me say at once that only quite ordinary things can be grown here ; so if anyone thinks he is going to hear about gigantic *Arboreum* hybrid *Rhododendrons* blooming in February, or *Leptospermums*, *Hoherias*, *Tricuspidarias*, *Fremontias*, and the like he will be disappointed. These notes are thus not written for experts, and are likely to interest only the ordinary gardener who has the misfortune to live in a cold district such as this is.

Let me say also that I do not specialize in anything particular, but subject to the limitations of climate I grow practically everything that is worth growing in the way of hardy herbaceous and alpine plants and shrubs, which I try to plant in suitable positions, and where they may be seen to the best advantage, and so give pleasure both to the not too critical expert and the ordinary garden lover.

I cannot say that there is anything particularly remarkable about this garden, though it may possess some slight advantage over other gardens by the lie of the ground and an abundance of water.

Abbotswood is situated on a slope of the Cotswolds running east and west, 550 feet above sea level, sheltered by trees from north and east, but owing to its proximity to the River Dickler subject to early and late frosts, which often cut off tender plants before September is out. The soil is known as inferior oolite and varies a good deal, being partly clay and partly oolite or limestone brash, which is not, however, very strongly impregnated with lime. The clay, unfortunately, is very wet and necessitates continual drainage, and wherever a shrub is planted a hole has to be dug and drain-pipes laid to take away the water to the nearest main drain. We find it also advisable to plant most shrubs, especially *Rhododendrons*, on mounds of prepared soil about 18 inches above the level to keep their roots off the cold wet ground, and to prevent the limey water percolating through to the roots.

The gardens are situated all round the house, the Flower Garden, approached by steps from the terrace, being on the south side and divided by yew hedges from a paved Rose Garden and stone pergola on the east side, a "Dutch" Garden on the west and herbaceous borders below the Flower Garden. Both the Rose Garden and the Dutch Garden are on a slightly higher level than the Flower Garden.

The Heather Garden is on the hillside, east of the house, the Tank Garden and Rock Ponds are on the west and the Rock Garden to the north, and beyond these the Shrub Gardens.

I will describe these as briefly as possible, and begin with the Flower Garden, which is of formal design and contains large beds filled almost entirely with hardy plants and roses, and is intended to be gay from the beginning of June until mid-October. The use of hardy plants is, of course, intended to save the labour of bedding out, but as a matter of fact a fair amount of stuff has to be bedded out to keep the garden gay all the summer and autumn.

There are sixteen more or less rectangular beds, each of which is planted mainly with a spring, a summer and an autumn blooming plant, and care is taken to use those plants which bloom for as long a period as possible. For instance :

- No. 1. May have Double White Rocket for June, Delphiniums for summer and Phlox for autumn.
- No. 2. Iris for June.  
Rose Felleberg for summer.  
*Statice latifolia* for autumn.
- No. 3. *Dictamnus Fraxinella*.  
Anchusa.  
*Fuchsia Riccartoni*.
- No. 4. Double Lilac Rocket.  
Hollyhocks.  
*Aster acris*.
- No. 5. *Iris pallida dalmatica* and Lupines.  
*Erigeron speciosus superbum*.  
*Rudbeckia Newmanii*.
- No. 6. *Paeonia officinalis rosea*.  
*Delphinium Belladonna* with *Lilium testaceum* and *L. regale*.  
*Aster Thomsonii* from July to October.
- No. 7. 'Beauty of Nice' Stocks followed by Chrysanthemums.  
Roses ('Gen. McArthur').  
Lemon Verbena, which requires a covering of leaves in winter.
- No. 8. Pæonies and Columbines.  
Alstroemeria.  
Aconitum (Spark's var.) and *Lobelia cardinalis*.
- No. 9. Stocks followed by Chrysanthemums.  
Rose ('Hugh Dickson').  
Fuchsia ('Mme. Cornellisson').
- No. 10. *Linum narbonense*.  
Echinops and *Salvia virgata*.  
Pink Phlox.

And so on.

Some of these flowers, such for instance as Irises, Delphiniums, Phloxes, Anchusa, Roses, and Hollyhocks, are used in several of the

beds, and space is also found for Sweet Williams, Canterbury Bells, Clarkias, Branching Larkspur, Salpiglossis, Pentstemons, Antirrhinums, Clematis, and Lilies.

All these beds have clumps of Narcissi and Tulips for spring, Antirrhinums, *Triteleia laxa*, early Gladioli, Spanish and English Irises for summer, and Gladioli and Montbretias for autumn; also many are edged with Violas, Fuchsia 'Dunrobin Bedder,' *Diascia Barberae*, Nemesias, *Mimulus Burnettii*, Crimson Mimulus, *Campanula carpatica*, *C. turbinata*, Anagallis, etc.

There are also four large round beds which in spring are bedded out with Forget-me-not, Arabis, Tulips, etc., and in summer with *Salvia horminoides*, *Salvia patens*, Pentstemons, and Snapdragons.

Dry walls surround the garden and are planted with Pinks, Aethionemas, Campanulas, Heucheras, *Cheiranthus mutabilis*, *C. linifolius*, Aubrietias, Sun Roses, *Hypericum olympicum* and its variety *reptans*, *Cytisus Ardoini*, as well as silver-leaved plants like Othonnopsis and Artemisias. The borders which surround the garden also contain Phlox, Kniphofia, tree and herbaceous pæonies, Oriental Poppy, Pyrethrum, *Cytisus praecox*, *C. pallidus*, *C. 'Moonlight'*, Columbines, Rudbeckias, *Aster acris*, *Agapanthus Moorei*, *Salvia virgata*, *Dierama pulcherrimum*, Galeas, Echinops, Eryngium, *Lilium umbellatum* and *L. pardalinum*, *L. tigrinum*, *L. croceum*, *L. Martagon album*, Dahlias, and *Nerine Bowdenii*.

Care is taken only to plant the best of each variety, to cultivate them well, and only use the purest blues amongst the Delphiniums, the best pink, mauve and crimson Phloxes, and to eject all scarlet flowers, such as the double scarlet Lychnis, *L. chalconica*, or 'Paul Crampel' geranium, which disagree horribly with the pale blues, pinks, mauves, and pale yellows.

This, I am afraid, has been rather a long dissertation on the Flower Garden, so I will pass more quickly through the Rose Garden, paved with plain rectangular York-stone slabs, which is so much more dignified than the dreadful crazy paving so much in vogue nowadays.

Each bed is edged with box and contains one sort of Rose and one sort of May-flowering Tulip, the names of which I will not enumerate, and will only say that the best, though not necessarily the newest, Roses are used. One side of this garden is flanked by a substantial stone pergola, which supports Wistaria, Purple Vine, Clematis, Honey-suckle, and those three grand climbing Roses, Paul's 'Carmine Pillar,' Paul's 'Scarlet Climber,' and 'Mme. Alf. Carrière.'

Many other climbing Roses are grown in other parts of the garden as well as a good many species such as *Hugonis*, *Moyesii*, *Willmottiana*, *altaica*, *sericea pteracantha*, *nitida*, *Brunonis*, *omeiensis*, *micrantha*, *rubrifolia*, etc., and I must not forget the old Bourbon Rose, 'Mme. Isaac Pereire,' which I believe is the earliest and the latest, the largest and the sweetest Rose in the garden, but which has been banished from most gardens because, forsooth, it has not the purity of form of, say, 'Ophelia.' Then there are the Moss and Cabbage Roses, the old

crimson Damask, the York and Lancaster, Rose de Meaux, the Apothecary's Rose, and many more, all beautiful and sweet-scented.

Beyond and partly sheltered by the pergola is a border containing late spring and early summer blooming plants such as Wallflowers, Columbines, Pæonies, Pyrethrums, Lupines, Crown Imperials, Orobis, *Geum Borisii* and *G. Heldreichii*, *Thalictrum purpureum*, Trollius, Pinks, Irises, Oriental Poppies, Violas, *Anchusa myosotidiflora*, *Scilla campanulata*, *Anemone apennina*, *A. Alleni* and *A. ranunculoides*, Muscari and Pheasant's Eye Narcissus.

There is not much to be said about the Dutch Garden, which contains a mosaic-lined dipping-tank fed by jets of constantly running water, a small garden house, and a quantity of small box-bordered beds, some of which are planted with dwarf Polyantha Roses and *Anemone coronaria*; others are bedded out with Forget-me-nots, Primroses, Aubrietias, Tulips, *Scilla sibirica*, Chionodoxas, etc., for spring, and Verbenas, Petunias, Salpiglossis, Snapdragons, etc., for summer.

Climbing roses, such as 'François Juranville' and 'American Pillar,' are planted on arches along the west side, with Phloxes, *Aster acris*, Gladioli, and Galtonias under them.

The Tank Garden, which was designed by Sir EDWIN LUTYENS, is planted with Water Lilies in tubs and the grass sides with Irish Yews. This garden is intended to be subdued in tone and restful to the eye in contradistinction to the rest of the garden, and with the exception of some Tree Pæonies, *Anemone coronaria*, and Turban Ranunculi for spring and sweet-scented Geraniums for summer there are only *Ceanothus Veitchii* and *C. rigida*, *Vitis Henryi*, *Aristolochia Siphon*, *Clematis montana Wilsoni*, *C. kermesina*, and some of the large-flowered Clematis on the south and west walls, and Honeysuckle, Deutzia, *Hydrangea arborescens grandiflora*, *Viburnum plicatum*, *Fuchsia gracilis* and Ivy on the wall facing north.

Outside the Tank Garden, on the wall facing south, is a really fine plant of *Carpenteria californica*, 11 feet high by 16 feet across. This is quite a healthy specimen and blooms freely every year.

Not far from the Tank Garden are the Rock Ponds and the Rock Bank. The latter has a considerable number of dwarf trees planted on it, including *Juniperus compressa* and *tamariscifolia*, *Cupressus Lawsoniana nana* and *C. minima glauca*, *Picea Breweriana*, *P. excelsa pumila* and *Clanbrassiliana*, *Thuja Späthii*, *Retinispora squarrosa sulphurea* and *R. ericoides*, *Cryptomeria japonica globosa nana*, *Pinus pumila*, *Ilex crenata nana*, *Cupressus obtusa nana*, *Thuja orientalis aurea nana*, *Juniperus japonica aurea*, *Quercus concordia*, *Magnolia stellata*, dwarf forms of *Berberis stenophylla*, *Retinispora filifera aurea*, *Cupressus Fletcheri nana*, Veronicas such as *Hectori* and *cupressoides*, and a good many others more or less correctly named.

On the top of the bank are taller shrubs, such as *Pinus montana*, *Cytisus praecox*, *Cupressus Lawsoniana erecta viridis*, *Osmanthus ilicifolius*, Lilac, Rhododendron, and *Arundinaria nitida*. Here also are Daffodils, Tulips, Aubrietias, Forget-me-nots, Gentians, Ferns,



FIG. 14.—ABBOTSWOOD. THE UPPER ROCK POND.

[To face p. 20.]

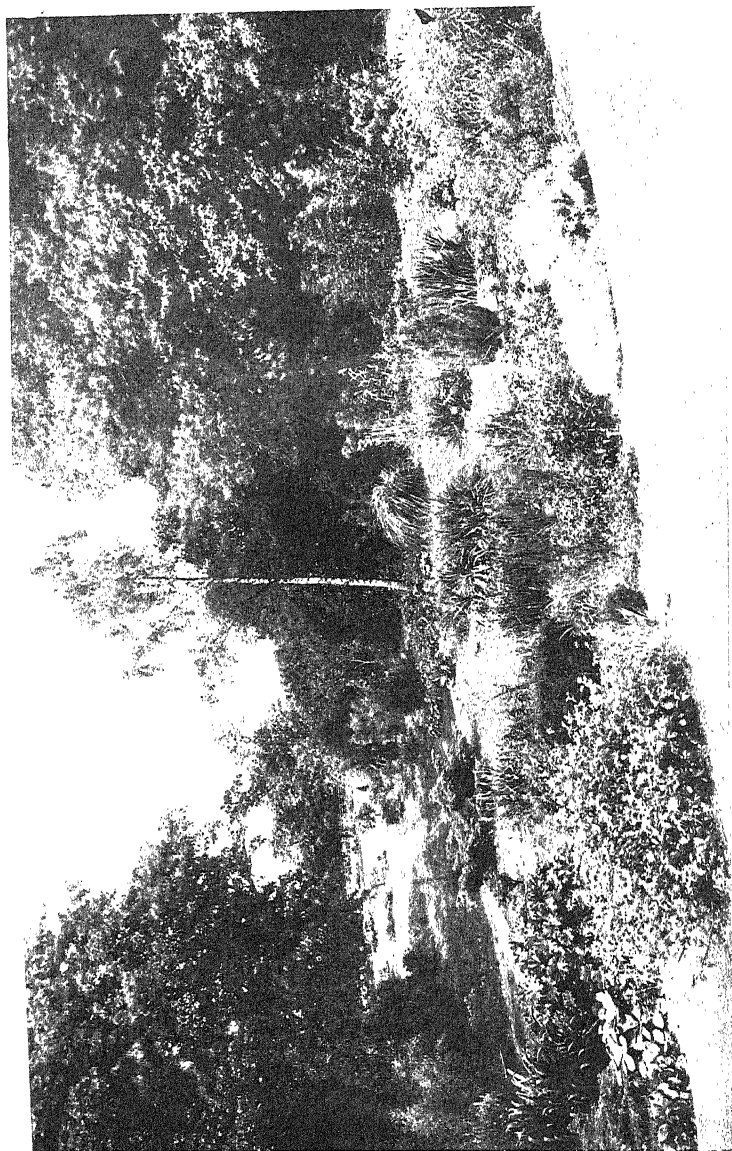


FIG. 15.—ABBOTSWOOD. NEAR THE ROCK PONDS.



etc. There is also a plant of *Veratrum californicum* which produced nothing but leaves for ten or twelve years, but about five years ago threw up six magnificent spikes of greenish-white flowers 7 feet high. Since then it has rested on its laurels and has done practically nothing.

The two Rock Ponds are fed by the confluence of three small streams which run through the Rock Gardens. These ponds and the small waterfalls above them and the Rock Bank were made by PULHAM & SON in 1903, and very well the work was done. Water has so often an annoying habit of finding its way round or under rocks, but there has never been any trouble here.

In the water are planted amongst other things *Lysichitum kam-schatense* (the white and yellow forms), *Iris albopurpurea* and *I. laevigata*, both of which do well, and the latter a very fine Iris not seen often enough; also our native *Iris Pseudacorus*, which requires dividing every year, but is worth growing for the beauty of its leaves.

Near the water are *Rodgersia aesculifolia* and *R. tabularis*, *Thalictrum dipterocarpum* and the white form, *Iris ochroleuca* and *I. aurea*, *Gentiana Asclepiadea*, *Eulalias*, *Lilium pardalinum*, Phlox, Lythrums, *Campanula rapunculoides* and *C. grandis*, the latter a splendid thing as it will flower profusely in dense shade, Trollius, *Thalictrum aquilegifolium*, *Kniphofias*, *Senecio clivorum*, *Juncus zebrianus*, etc.

Foliage plants are also rather largely made use of, such as *Arundo Donax*, *Phormium tenax*, Pampas grasses, including the golden variety, *Funkia Sieboldi*, *Arundo conspicua*, *Hydrangea Sargentii* (in shade and sheltered as much as possible from wind), *Fatsia japonica*, Yuccas in variety, and *Eryngium pandanifolium*.

Here also has been planted a Bamboo Avenue, in front of which are Japanese Maples, Rhododendrons, Azaleas, the purple-leaved Sumach, etc., with *Acer laetum*, Double Cherries, Lilacs, *Pyrus Malus purpurea*, etc., at back. Large groups of Crocuses, Daffodils, and Polyanthus are also here for spring, and Colchicums, Cyclamen, and *Crocus speciosus* for autumn.

We now come to the so-called Wild Garden, where is also the Rock Garden, the latter having been built up gradually during the last twenty years. I think it will be conceded that a rock garden should be as far away from any formal surroundings as possible, and therefore the Wild Garden seems a suitable place for it, provided the situation is sunny and not too much shaded by trees. At Abbotswood I was fortunate in finding plenty of water and fairly steep ground to make the Rock Garden on. When this was started it was open field, with a few trees on it and no water; but the overflow of a very strong spring not far away was intercepted and introduced into a little valley, now called the "Old Stream," to distinguish it from a second one which was made a few years later and called the "New Stream." Most of the rocks and waterfalls were made by PULHAM, though not all at the same time. The soil is heavy clay with a good deal of lime in it, which up to now has defeated all efforts to grow *Iris Kaempferi*, though this will grow moderately well in the Kitchen Garden.

Perhaps the chief feature of the "Old Stream" is the *Primula rosea*, which has sown itself all down the stream in thousands, and in April, when associated with 'Heavenly Blue' Muscari, pale yellow Daffodils, white *Anemone apennina*, and *Spiraea arguta*, is a very fine sight. The Muscari is also made rather a feature of, and looks well associated with *Pyrus* (*Cydonia*) *Simoni*, yellow Primroses, *Saxifraga Wallacei*, and 'Vermillon Brilliant' or 'Prince of Austria' Tulips. Good forms of the Wood Anemone, such as *Robinsoniana*, *Alleni*, and 'Blue Bonnet,' as well as *Anemone blanda*, *apennina*, *fulgens*, *ranunculoides* and *coronaria*, are also grown in quantity for spring effect. Later come Trollius, Thalictrum, *Primula sikkimensis*, Tulips, *Iris sibirica*, Spiraeas in variety, Mimulus, *Allium ascalonicum*, which is one of the prettiest things in the garden at the end of July and early August. Another good Allium for this time of year is *sphaerocephalum* or *dependens*, which bears round heads of purple flowers on two-foot stalks. Both these Alliums are worth growing, though not seen in many gardens.

After these come Phloxes, Montbretias, Kniphofias, Japanese Maples, *Cyclamen neapolitanum*, and a group of *Cercidiphyllums*, which turn gorgeous colours in the autumn. I have no doubt there must be other gardens where *Cercidiphyllum* colours equally well, but it is certainly the most brilliant thing in this garden about the end of September. I have always attributed its fine colouring to the fact that it is planted with its roots actually in the water. I have planted specimens in other parts of the garden away from water, and the leaves are hardly half the size and colour but poorly.

Another feature of the "Old Stream" is the *Juniperus compressa*, or dwarf Irish Juniper, which appears to like damp clay, as the two best specimens each measure 3 feet 1 inch and are quite perfect in shape and colour.

It would weary the reader of these notes if I detailed all the things which grow here, but mention may be made of a small plot adjoining the carriage drive which is planted for winter effect with *Polygala Chamaebuxus*, *Cyclamen Atkinsi* and *C. Coum*, *Crocus Imperati*, *C. Sieberi*, *C. Tomasinianus* and *C. aureus*, Winter Aconite, Hamamelis, *Berberis hyemalis*, *Daphne Mezereum*, *Helleborus corsicus*, Snowdrops, *Leucojum*, Christmas and Lenten Roses, *Anemone blanda*, *Hyacinthus azureus*, *Primula altaica*, *Iris histrioides* and *I. reticulata*, *Erica darleyensis*, *Chionodoxas*, and *Scilla sibirica*. If January or February happens to be fine these harbingers of spring make quite a good show.

The Rock Garden really consists of a series of beds made in the grass, with rocks cropping out in proper strata, each stone being carefully laid and slightly tilted back. The local stone is possibly not so beautiful and certainly not so easy to lay as the mountain limestone which is almost invariably used for the rock gardens at Chelsea Show. I once got the winner of the First Prize at Chelsea Show to lay some of my local stone for me, and a most hopeless muddle he made of it; most of this work had to be redone. The Cotswold stone is rather

soft and apt to split by the frost, but it is easily procured and certainly looks better than any other in this county.

*Gentiana acaulis* seems to have a special partiality for this stone and does very well at Abbotswood, and thousands of blooms may be counted about the first week in May. *Gentiana verna* is not nearly so easy and must be given lime-free soil and granite chippings. Other Gentians grown here are *G. septemfida*, *G. Purdomii*, *G. lagodechiana*, *G. Farreri*, and *G. sino-ornata*, the last named carrying its deep blue flowers into November. Some people seem to think that a rock garden in autumn has nothing in it, but some of the following, if planted not too far from one another, will make a good show all September and October :

Fuchsias *pumila*, 'Carmen,' 'Dunrobin Bedder,' *myrtifolia* and *corallina*; Kniphofias *Nelsoni*, *McOwani*, *corallina*; *Crocus speciosus*, *C. zonatus*, *C. longiflorus*; Colchicums in variety.

<i>Nerine Bowdenii</i>	<i>Cyclamen neapolitanum</i>
Dwarf Pampas Grass	<i>Sedum spectabile</i>
<i>Senecio pulcher</i>	<i>Polygonum vacciniifolium</i>
<i>Stevia purpurea</i>	Gentians in variety
Japanese Maples	<i>Oenothera riparia</i>
<i>Silene Schafta</i>	„ <i>speciosa rosea</i>
<i>Yucca filamentosa</i>	<i>Primula capitata</i>
<i>Verbena venosa</i>	<i>Androsace lanuginosa</i>
<i>Dianthus chinensis</i>	<i>Zauschneria californica</i>
„ <i>monspessulanus</i>	<i>Statice incana</i>
<i>Antirrhinum semperflorens</i>	<i>Viola thuringiana</i>
<i>Potentilla fruticosa</i>	„ 'Lady Crisp.'

In writing of rock plants it is difficult to know where to begin and where to stop, and I will only mention a few of the less common ones which grow here. The big trumpet Daffodils, such as 'Golden Spur,' 'Emperor,' 'Empress,' 'Sir Watkin,' 'King Alfred,' etc., are only grown in the Wild Garden, but *Narcissus Bulbocodium*, *N. minor* and *minimus*, *triandrus albus*, 'W. P. Milner,' *cyclamineus*, 'White Lady,' 'Queen of Spain,' 'Southern Gem'; early Irises such as *histrioides major*, *reticulata*, *montana*, and *chamaeciris*, and of course the indispensable *Chionodoxas*, *Scillas*, and a good many Tulip species, such as *Kaufmanniana*, *praestans*, *dasytemon*, *Eichleri*, *linifolia*, *Clusiana*, *ingens* and *Sprengeri*, all find a home in the Rock Garden.

It has been found more satisfactory to grow the very early Saxifrages such as *Burseriana*, 'Faldonside,' *Irvingii*, etc., in a cold house where they are protected from wind and rain, snow and slugs. There, too, are Soldanellas, Primulas such as *Winteri*, *Allionii*, *pubescens alba*, and many others, and *Crocus* and *Galanthus* species, *Narcissus nanus* and *minimus*, *Iris persica*, *Varianii*, and *Heldreichii*, *Erythroniums*, *Sisyrinchiums*, *Lewisias*, early *Daphnes*, and many more with which my gardener, F. INSTIN, has been very successful, and which make the cold house gay from the middle of January to the middle of May.

Other things growing outside are :

<i>Acantholimon venustum</i>	<i>Oxalis enneaphylla</i>
St. Bavo Anemones	„ <i>adenophylla</i>
<i>Daphne Cneorum</i>	<i>Cyananthus lobatus</i>
<i>Edraianthus serpyllifolius</i>	<i>Asperula alba</i>
„ <i>pumilio</i>	<i>Cytisus kewensis</i> and <i>Beanii</i>
<i>Shortia galacifolia</i>	<i>Cistus florentinus</i>
„ <i>uniflora</i>	„ <i>purpureus</i>
<i>Erythronium Johnsoni</i> , <i>californicum</i> , etc.	<i>Mimulus cupreus</i>
<i>Onosma tauricum</i>	„ <i>radicans</i>
<i>Aethionemas</i> in variety	<i>Lithospermum</i> 'Heavenly Blue'
<i>Primula chionantha</i>	<i>Iris montana</i>
„ <i>sikkimensis</i>	„ <i>gracilipes</i>
„ <i>pubescens alba</i>	Alpine Phloxes in variety
„ <i>marginata</i> , and many others	<i>Phlox Douglasii</i>
<i>Cypripedium Calceolus</i>	<i>Anthericum Liliastrum</i>
„ <i>montanum</i>	<i>Paeonia obovata alba</i>
„ <i>parviflorum</i>	<i>Dianthus alpinus</i>
<i>Linum alpinum</i>	„ <i>neglectus</i>
„ <i>viscosum</i>	„ 'Spencer Bickham'
„ <i>arborescens</i>	„ <i>Sieboldii</i>
„ <i>flavum</i>	„ <i>microlepis</i>
<i>Moltkia petraea</i>	„ <i>fragrans</i>
<i>Oenothera speciosa rosea</i>	„ <i>arvernensis</i> , etc.
<i>Ourisia coccinea</i>	<i>Orchis foliosa</i>
<i>Campanula pulla</i>	<i>Erythraea diffusa</i>
„ <i>Allioni</i>	<i>Pentstemon Scouleri</i>
„ <i>turbinata</i> , and many more	<i>Roscoeia Humeana</i> , <i>cautilioides</i> , etc.
	<i>Omphalotes Luciliae</i>

The "New Stream" has many *Primulas*, such as *involucrata*, *Munroi*, *rosea*, *sikkimensis*, *Veitchii*, and the improved form of *Veitchii* called 'La Lorraine,' *pulverulenta*, *japonica*, *Bulleyana*, *Beesiana*, *helodoxa*, and many hybrids of these. There are also *Iris gracilipes*, *Jeffersonia dubia*, and *J. diphylla*, *Haberlea Ferdinandi-Coburgii*, *Trollius Ledebouri*, *Lobelia cardinalis*, *Cypripedium spectabile*, some good forms of the new *Astilbes*, *Deinranthe bifida*, *Gentiana Asclepiadea*, *Trilliums*, *Uvularia grandiflora*, *Asperula nitida*, *Dodecatheons*, *Erythroniums*, *Soldanellas*, *Pinguiculas*, double *Marsh Marigold*, *Tiarella cordifolia*, and *Anemone Robinsoniana* and *Fritillaria Meleagris*, both of which have naturalized themselves in the grass by the stream, *Lomaria* and *Adiantum pedatum* (the hardy Maidenhair Fern), also *Sisyrinchium grandiflorum*, which has never been very happy at Abbotswood, but now at last seems at home in lime-free soil and partial shade.

Before leaving the Wild Garden, mention ought to be made of the

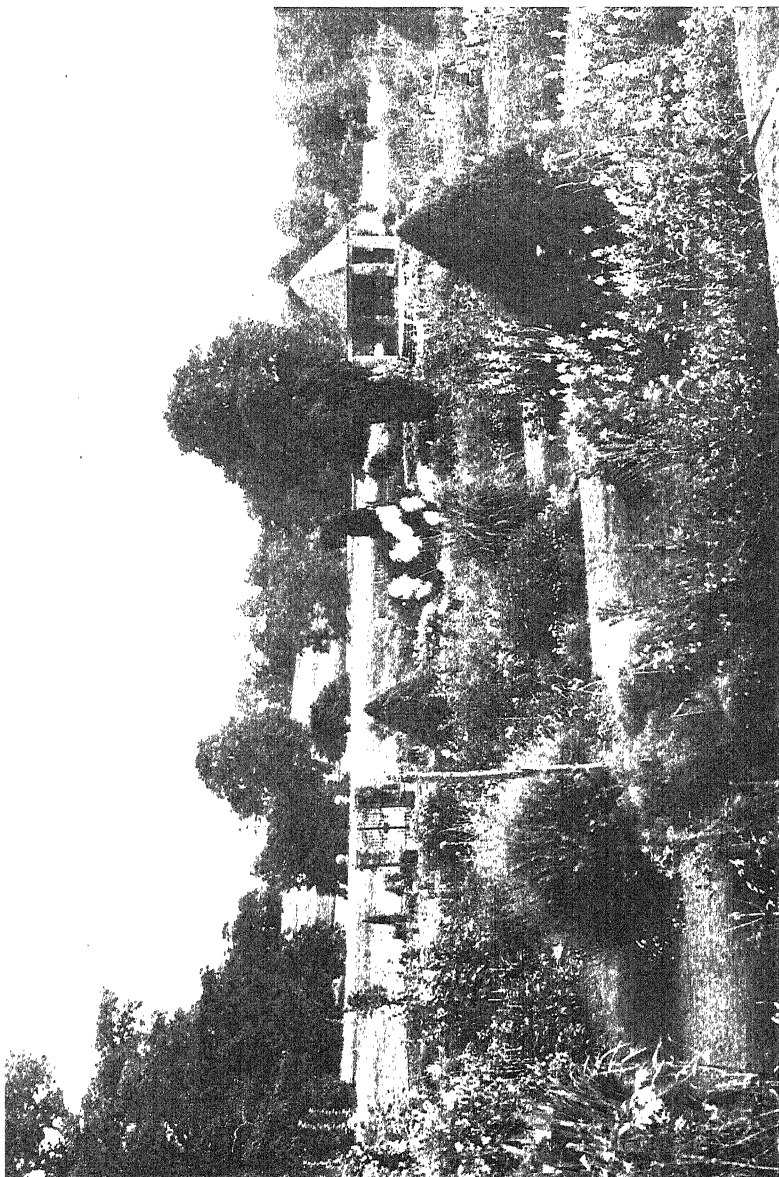


FIG. 16.—ABBOTSWOOD. FLOWER GARDEN, LOOKING WEST.



FIG. 17.—ABBOTSWOOD. THE GARDEN HOUSE BORDER.

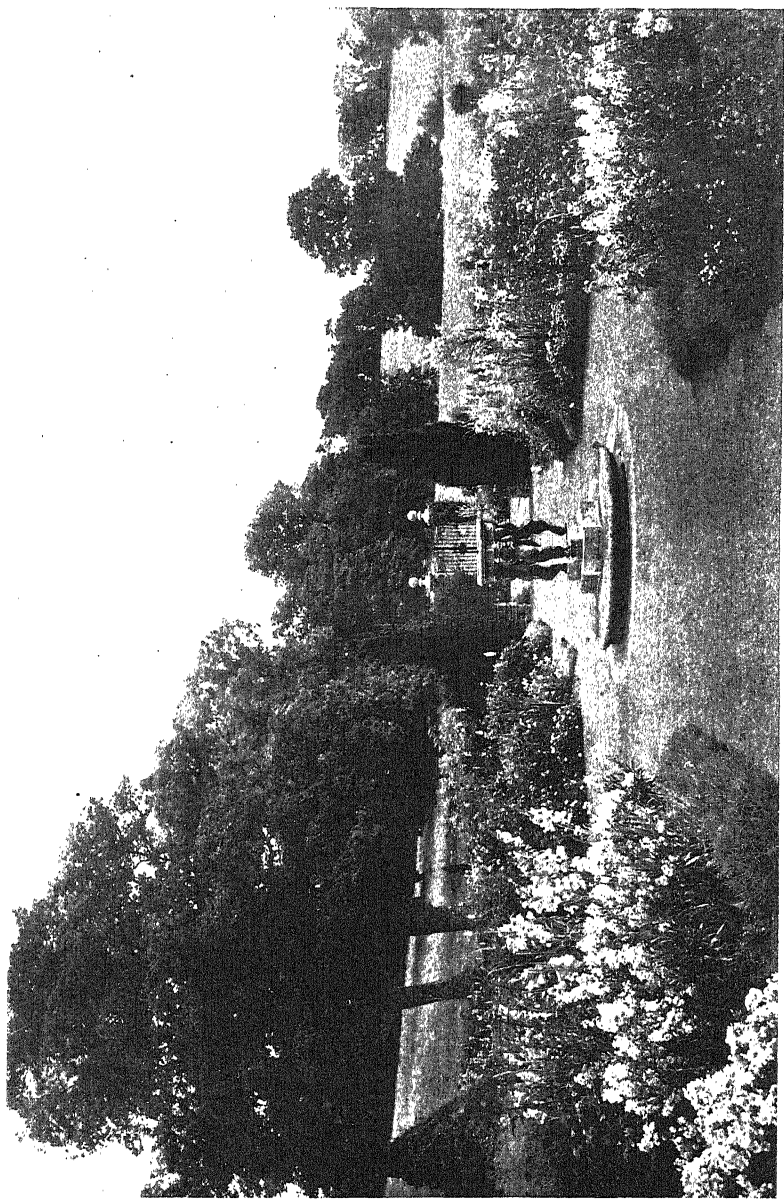


FIG. 18.—ABBOTSWOOD. THE FLOWER GARDEN.

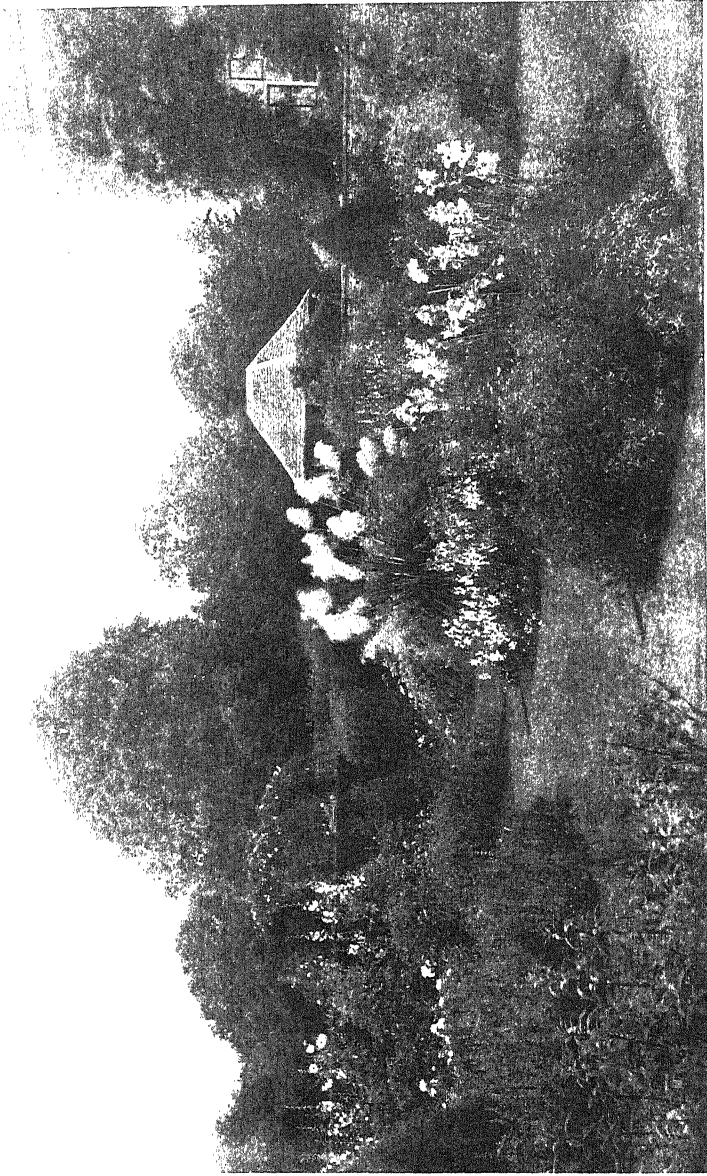


FIG. 19.—ABBOTSWOOD. N.W. CORNER OF FLOWER GARDEN.

[To face p. 25.]



*Colchicum speciosum*, which grows well here if divided every second or third year, and produces some thousands of its purple blooms in mid-September. The white form also does well, but the stock of these is much smaller. Kniphofias are also largely grown in the grass, and make a splendid show for a long season. By growing the early and late varieties they may be had in bloom from June to the middle of October.

A third small stream runs down the edge of the wood and is planted with Ferns, Primroses, Forget-me-nots, *Cyclamen europaeum* and *neapolitanum*, with *Campanula lactiflora* and *Anchusa myosotidiflora* farther back under the trees.

Farther on through the small wood is the Heather Garden, which was begun in 1905 and is about three-quarters of an acre. It is planted on ground sloping from east to west, and although consisting of heavy and rather wet clay all the ordinary heaths hardy in this country do quite well in it, with the exception of *Erica cinerea coccinea*, which always refuses to grow. There are a few plants of this variety growing on the edge of a Rhododendron bed, but even there it is not happy.

There are, roughly speaking, three main periods of flowering for the heaths, viz.: January to April with *carnea alba*, *darleyensis*, *carnea*, *lusitanica* and *mediterranea*. In May come *australis* and *Veitchii*, closely followed by *cinerea* and *Tetralix*, and in August come the varieties of Ling, the first being *tenuis* and the last *Serlei*, which will carry on the flowering period to the end of September. The most constant bloomers, however, are the Menziesias, which bloom from early July till November. As *carnea alba* begins in December, it will be seen that there is not a single month without bloom in the Heather Garden, and in winter almost every variety of Heath takes on a different shade of green. There is also the beautiful copper-coloured variety called *cuprea* and the variety *aurea*, which though golden in summer turns a pretty shade of pink in winter. Then again the red-brown dead flowers of *stricta* and *vagans* make these varieties almost more beautiful in winter than in summer.

Only about a dozen species can be grown in the open air in England, and all these are growing at Abbotswood. They are *arborea*, *australis*, *carnea*, *ciliaris*, *cinerea*, *lusitanica* (Codonoides), *mediterranea*, *scoparia*, *stricta*, *Tetralix*, *vagans*, *vulgaris*, or Ling, and *Menziesia polifolia* (St. Dabeoc's, or the Connemara Heath). Most of these heaths have numerous varieties—white, pink or purple—and all are worth growing. They are planted right up to the trees, 50 to 100 in a clump, with occasional single plants or small groups of the taller varieties such as *lusitanica*, *arborea*, *alpina*, and *australis*, and associated with them are *Spartium junceum*, Cytisus, Rhododendrons, Azaleas, *Berberis Thunbergi*, Double Gorse, Euonymus, Japanese Maples, *Polygonum vacciniifolium*, and Foxgloves.

As tender plants are liable to be cut down early, autumn tints have been considered and a collection made of most of the trees and shrubs which turn a good colour. The best are the before-mentioned

Cercidiphyllum and the Japanese Maples, especially the variety *Osakasuki*, *Nyssa sylvatica*, *Berberis Thunbergi*, *B. dictyophylla* and *yunnanensis*, *Acer Ginnala* and *Acer rubrum*, *A. lactum*, *A. nikoense*, *A. rufinerve*, *Euonymus alatus*, *Vaccinium corymbosum*, *Azalea Vaseyi* and *A. pontica*, *Amelanchier canadensis*, *Fothergilla major* and *F. monticola*, *Enkianthus japonicus*, *Prunus Sargentii*, *Pyrus Sorbus japonica*, *Pyrus arbutifolia*, *Rhus sinica*, *Eucryphia pinnatifolia*, Scarlet Oaks, *Pyrus discolor*, and a good many more.

It is impossible in an article such as this to mention all the shrubs grown here, but there is a fairly large and up-to-date collection of hardy Cherries, *Pyrus*, *Prunus*, Lilacs, Thorns, *Acers*, *Viburnums*, *Cotoneaster*, *Berberis*, *Philadelphus* and *Sumachs*, and there is certainly nothing better than those two comparatively recent introductions *Viburnum Carlesii* and *Osmanthus Delavayi*.

Some shrubs and climbers which are growing here, but which an old-fashioned winter would probably kill, are :

<i>Veronicas</i> in variety	<i>Pittosporum Mayi</i>
<i>Carpenteria californica</i>	<i>Berberidopsis corallina</i>
<i>Plagianthus Lyalli</i>	<i>Billardiera longifolia</i>
<i>Solanum jasminoides</i>	<i>Ceanothus Veitchii</i>
„ <i>crispum</i> (the Glasnevin variety)	„ <i>rigidus</i>
<i>Olearia Gunni</i> and <i>macrodonta</i>	<i>Hydrangea quercifolia</i>
<i>Styrax japonica</i>	<i>Photinia serrulata</i>
	<i>Feijoa Sellowiana</i>

*Desfontainea spinosa* has also been tried several times, and should be at least as hardy as some of the above, but ten degrees of frost seems more than it can bear here, though I have seen it stated that it is as hardy as that other absolutely hardy Chilian shrub *Berberis Darwinii*, and I have certainly seen it quite uninjured by a zero frost in Northumberland.

It only remains for me to say a word or two about that wonderfully beautiful family of *Rhododendrons*, a few of which everyone who tries to garden at all seriously should endeavour to grow. It was always considered there was too much lime in our soil to grow *Rhododendrons*, but a few *catawbiense* and other hardy hybrids were planted in the clay of the Heather Garden some twelve or fifteen years ago and have done quite well; but only during the last three or four years have peat from Camberley and sand from Bedfordshire been added to local leaf-mould and loam, and the results have been sufficiently encouraging to make me persevere.

Some sixty or seventy species have been planted, and excepting the early blooming varieties, whose blooms generally get killed by late frosts, they have done fairly well. These latter will probably be eliminated, and only varieties which do not bloom before mid-May planted.

The Lapponicum varieties seem quite hardy, and one of the best of the other quite reliable species is *yunnanense*, which never fails

to bloom in the freest possible manner about the middle of May. Here the *Rhododendron* season lasts from the first week in May, beginning with the 'Duchess of Portland' and finishing about the end of June with 'Lady Hillingdon' and 'Gomer Waterer.' After them come *occidentale* and *viscosum*, which, though deliciously sweet, do not make much of a show in the garden. The late flowering *discolor* and *auriculatum* have not bloomed here yet, and the latter probably never will.

In looking through these notes I see nothing but strings of names, which I am afraid are very uninteresting when given by themselves without any comment, but it is impossible in an article like this to discourse on all the plants growing in this garden, and were I to try to do so I should have to write books like Mr. BOWLES on "My Garden in Spring," "My Garden in Summer," etc.

People who know this garden are sometimes kind enough to say there is more colour in it than in any other they know. If this is so, it is because the particular flowers of each month are massed as much as possible, and although it is rather difficult to mass flowers in *January* there are *Cyclamen ibericum* and *C. Coum*, *Crocus Imperati* and *C. Sieberi*, Christmas Roses, Ericas, Hamamelis and various others, if the weather is mild.

*February* has Winter Aconite, Snowdrops, Crocuses, *Anemone blanda*, Daphne, Megaseas, Hellebores, *Milla uniflora*, *Pulmonaria azurea*, and a good many more, besides those enumerated for *January*.

In *March* come many Crocuses, Chionodoxas, Scillas, the earliest Daffodils, Hepaticas, and *Erica carnea*.

*April* has Daffodils, early Tulips, *Anemone apennina*, and Heavenly Blue Grape Hyacinths.

*May*, Tulips, Forget-me-nots, Gentians, *Narcissus poeticus*.

*June*, Oriental Poppies, Irises, Pæonies, Lupines, Columbines, and Rockets.

*July*, Roses, Larkspurs, Lilies, Chinese Pæonies.

*August*, Phloxes, Hollyhocks, and Dahlias.

*September*, Kniphofias, Dahlias, Sunflowers, Tiger Lilies, Scarlet Lobelias, Colchicums and Cyclamens.

*October*, Michaelmas Daisies, Chrysanthemums and Cyclamens.

*November*, the Scarlet Oaks, Liquidambar and Vacciniums are still beautiful, and berry-bearing shrubs like *Cotoneaster horizontalis*, the Barberries and Sea Buckthorns will help to make the garden interesting till the end of the year.

No description of Abbotswood would be complete without a reference to the slugs, which surely must be larger and finer and more numerous than in any other garden in England. They are the large black kind, about three inches long, and one can go out any warm night with a torch and kill a thousand. Bran traps for catching them at night, and powdered alum for protecting choice plants, are the remedies employed.

Mice also find splendid breeding and hiding places in the numerous

dry walls, and do a lot of harm in the spring. Breakback traps and virus help to keep them in check.

Rabbits are wired out, but moles seem very fond of the moist soil near the water and give a lot of trouble, and pheasants are very destructive to *Anemone* and *Erythronium* buds.

This year wasps have attacked and eaten through the stems of many of the *Kniphofias*. They do not seem to mind alum, and are only driven off by Keating's powder for a time and soon return. Curiously enough, they have only attacked the choicest varieties.

The herbaceous borders are arranged for two seasons only—spring and summer, spring and autumn, or summer and autumn—as it has been found impossible to keep the borders bright for all three seasons.

There is also a border in the Shrub Garden devoted entirely to *Asters*. The dwarfed varieties are supported by twigs and the taller ones are tied to five or six canes. The labour tying them up is considerable, but the effect when the plants are in bloom makes it well worth while.

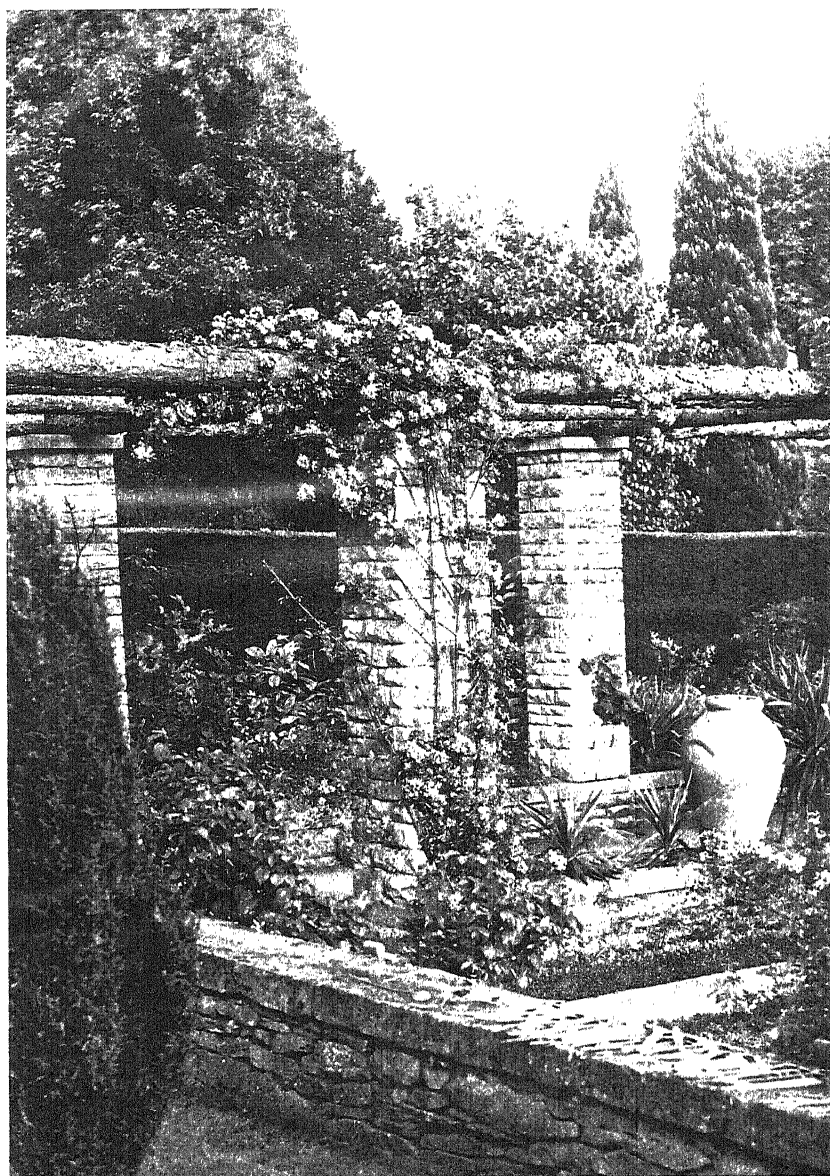


FIG. 20.—ABBOTSWOOD. A CORNER OF THE PERGOLA.

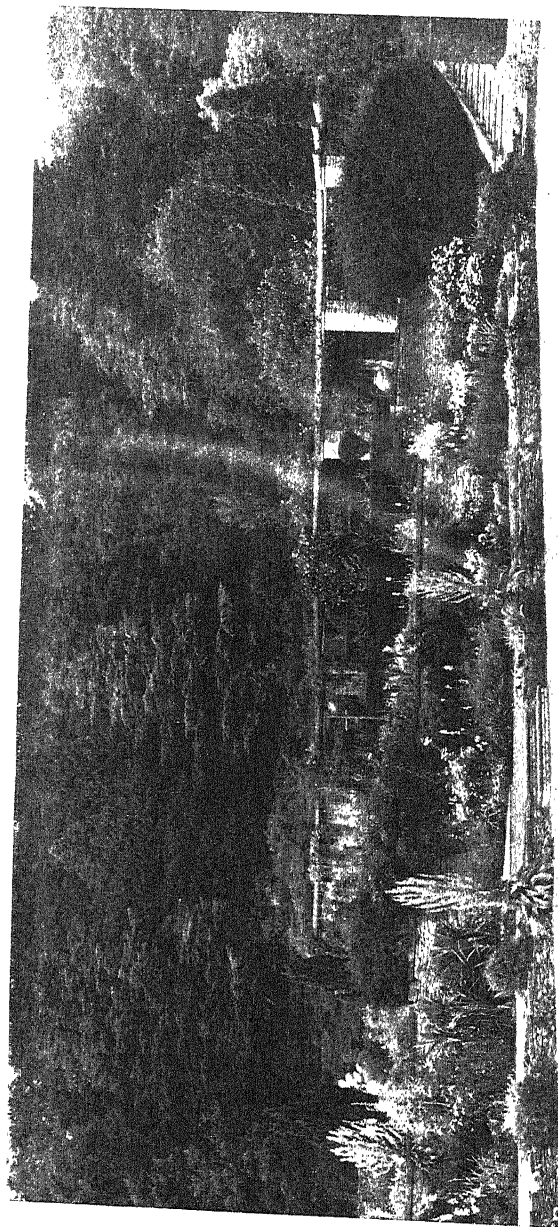


FIG. 21.—ABBOTSWOOD. THE END OF THE SUMMER BORDER.

[To face p. 29.]

## THE BOTANICAL MAGAZINE : ITS HISTORY AND MISSION.

By Dr. O. STAFF, F.R.S.

[Read February 24, 1925 ; Mr. C. T. MUSGRAVE in the Chair.]

BEFORE I enter on the subject of my lecture I would fain impress on you that the subject is not only eminently fit to be discussed in this place and before this audience, but it is also of such a nature as to appeal to you as Fellows of the Society most directly. It is your concern, in as far as you take interest in the activity of the Society and in its standing as the foremost promoter of the science and art of gardening.

It is little more than four years since the last part of Volume 146 of the *Botanical Magazine* appeared with the fateful announcement that in consequence of the increased and still increasing cost of producing Curtis's *Botanical Magazine* the publishers proposed to terminate the publication with that part. It had then completed the 134th year of its publication—a publication uninterrupted and of exemplary regularity for the most part of its long life and always in the vanguard of illustrated botanical literature; and the number of its plates, all drawn and coloured from living specimens, was near reaching 9,000. Botanists all over the world read the announcement with deep regret. In this country gardeners both amateur and professional who had become accustomed to consulting the Magazine for the identification and the study of their plants felt the threatened loss still more. To many of them the *Botanical Magazine* had become almost a national institution of which they might justly be proud; and no wonder, for it had served steadily four generations in the pursuit of their pastime, study, and practice. Almost a year elapsed, and the pious hope of the resuscitation of the *Botanical Magazine* appeared no nearer its realization when, mainly on the prompting of a few public-spirited men, the Royal Horticultural Society came to the rescue, took over the *Botanical Magazine* and arranged for the continuation of its publication. It was a bold and generous step, taken under difficult conditions. You in your corporate capacity as the Society are the owners of the Magazine, and through your Council the trustees of a notable enterprise and a great tradition. It therefore behoves us all to do our best for the furtherance of the work, that it may succeed and mark another addition to the usefulness and the repute of this great Society.

Having said so much I proceed now to my immediate subject, the History and the Mission of the *Botanical Magazine*.

To deal with it as adequately as possible in the short time at my disposal, I propose to give first a short sketch of the origin of the Magazine and then of its general history up to the end of 1920 ;

secondly, to give an account of its technical production; thirdly, to discuss the tasks which the successive editors (who were mostly also the authors) set themselves, partly in compliance with their own conception of the leadership which was implied in their office, and partly in response to the state of the science of botany and the application it was capable of in the art of gardening. Lastly, I should like to deal with what the *Botanical Magazine* stands for, its tradition as a legacy of the past and its mission for the future.

*Firstly, then, as to its origin.* The CURTIS whose name is still linked with the title of the *Botanical Magazine* was WILLIAM CURTIS, a Hampshire man. His father was a master tanner at Alton and a member of the Society of Friends. Young WILLIAM was destined for the medical profession, and he was in due time apprenticed to his grandfather, who was an apothecary at Alton. It is said of WILLIAM that he was introduced to botany by the ostler of the inn next to his father's house, who possessed some old herbals. However that may be, he was certainly already imbued with an ardent love of Nature and equipped with a fair knowledge of animals and plants when, at the age of twenty, he left his native town for London, to practise his profession on which he depended for his maintenance. He had not set up long as a practitioner when he took a partner so that he might have more leisure for the pursuit of the studies he had at heart. This step, serious as it was for a man of his means, was soon followed by a more drastic decision—that of selling out of the partnership altogether. He was now free to follow his inclination. He threw himself with redoubled enthusiasm into his studies of Natural History, reading, collecting, and seeking stimulating intercourse with similarly minded men. He assiduously explored the flora of London and its neighbourhood, but he was not satisfied with what he saw in lane and field. He wanted to have the plants he found there under his eyes, besides many more from other parts of the country, and no doubt also from the gardens. He bought a small piece of land at Bermondsey to grow them, and so he became not only a naturalist, but also a gardener. His first publications were entomological, but his competence as a botanist was soon recognized. In 1772, although not yet twenty-seven years of age, he was appointed Præfectus Horti and Demonstrator to the Society of Apothecaries at Chelsea, an office in which the celebrated PHILIP MILLER, the author of the "Dictionary of Gardening," had been one of his predecessors. The appointment gave him at once a prominent standing and authority among botanists and horticulturists. Soon after CURTIS had taken up his duties at Chelsea he proposed a course of lectures on Botany for medical students. This, although approved and recommended by the Society of Apothecaries, did not, for some reasons, take effect. But he was eager to share his knowledge, experience, and enthusiasm with others and to form what we might call a "school" around him, and with the help of some of his influential patrons he acquired land in what was then the village of Lambeth



Marsh, somewhere between Waterloo Station and Westminster Bridge, and laid it out as a Botanic Garden after having given up his experimental plot in Bermondsey. Here in his own Botanic Garden of Lambeth Marsh he lectured on botany and horticulture. He was greatly helped in the development of the garden by contributions from the Royal Gardens at Kew, from the Earl of BUTE's garden at Luton, from Dr. FOTHERGILL at Upton, Dr. PITCAIRN at Islington, the Earl of PLYMOUTH, Sir JOSEPH BANKS, the Rev. J. LIGHTFOOT, the Rev. Dr. GOODENOUGH, and many others, and from a number of nurserymen, among which he mentions LODDIGES. Compare this with lines 4 and 5 of the title-page of the *Botanical Magazine* as it is at present: "Plants from the Royal Botanic Gardens, Kew, and other Botanical establishments and private gardens." He might have used the same phrasing for advertising this Lambeth Garden from which the idea of the *Botanical Magazine* was destined to spring; but he had not yet conceived it. Meanwhile he was occupied with developing his garden, with lecturing, and with an ambitious plan with a different object. His lectures attracted a large audience of men and women. Admission to the gardens, including the lectures, was by subscription of a guinea a year; by paying two guineas subscribers could claim a share in the distribution of plants and seeds as they became available every year. He issued catalogues of the plants grown in the garden for the benefit of his subscribers, and the entire catalogue is said to have run to about 6,000 species. The plants were distributed over separate "quarters"—medicinal, culinary, poisonous, agricultural, and British. There was, further, one given up to the demonstration of the Linnæan System, whilst another was "furnished with hardy, ornamental flowers and shrubs, chiefly exotic and cultivated in the gardens of the curious." Note the delightful expression, "the curious"—those who are anxious to learn—and compare it with the paragraph on the title-page of the first volume of the *Botanical Magazine*: "A Work intended for the use of such Ladies and Gentlemen and Gardeners as wish to become scientifically acquainted with the plants they cultivate." The connexion is evident.

You will understand why I have dwelt on this phase of CURTIS's activity at some length. It was here that the conditions were prepared from which the idea of the *Botanical Magazine* arose and which at the same time decided the form it assumed. There was, however, another circumstance which actually forced CURTIS's hands. Catholic as his botanical interests were, his principal ambition was from early days connected with the native flora of his country, and especially with that of the neighbourhood of London, which he knew so well and which he explored alone or with his friends and pupils in every direction. He aspired to be its demonstrator and interpreter, and, putting the best he could give in knowledge, labour, and artistic conception into one great effort, he, with the support of the Earl of BUTE and other helpers, embarked on the publication of a "Flora Londinensis" in a truly monumental style. The first

part was issued in 1777, the year when, overburdened with work, he resigned from his post at Chelsea. He laboured at it for another ten years, the result being two magnificent volumes of great bulk, weight and value. The response from the public was unfortunately not sufficient to cover the expenses connected with its production, and he saw himself at last obliged to relinquish this work. It had exhausted his means, and he found himself in debt. However, as the "*Flora Londinensis*" died thus prematurely, it made room for another child of his active and versatile brain. If the Londoners did not care enough for the mostly unassuming plants which surrounded them on their everyday walks and their rambles in the country to support a stiffly serious, albeit beautifully illustrated production like the "*Flora Londinensis*," they loved undoubtedly the gayer, more varied, and to them more novel flowers which adorned their gardens, and which were constantly added to from many parts of the globe. Gardening, in the sense in which we understand it, had already taken deep root in the imagination of the people and become either a general hobby or an earnestly pursued sport and study of not a few whose means permitted them to indulge in the luxury of maintaining living collections of all that was beautiful in the world of flowers, or quaint, or appealed in some other way to their mind or senses. Often little enough was known about the plants, and the little was known by few. A spirited people—and only a spirited people would go in so whole-heartedly for a pastime like horticulture—does not rest satisfied for long with the mere pleasure derived from colour and form and scent, particularly when these are attributes of life. It will ask questions about whence and how and why, and, to begin with, it cannot ask those questions without having definite names to denote the objects of its interest; nor will the answer fulfil its purpose unless the names always carry the same meaning with them. There was, then, undoubtedly a want to be satisfied. CURTIS saw it. His was the opportunity to deal with it. You will remember the quarter of ornamental and foreign plants in his Botanic Garden at Lambeth Marsh. I have not seen a copy of the catalogue of that particular quarter, but as the catalogue for the whole garden runs to 6,000 species it was no doubt well stocked. You have also heard that he lectured in his garden and that his audience was large and appreciative. He had his hand on the pulse of that audience and he understood. But even so it is doubtful whether he would have answered the call. We are told that he felt the production of the *Botanical Magazine* a drudgery rather than a work of love, such as the "*Flora Londinensis*" undoubtedly was. The latter had almost ruined him and something had to be done to retrieve his fortunes. So, prompted by need, he yielded to "the solicitations of Ladies and Gentlemen, subscribers to his garden," to use his own words, and to the friendly advice of ROBERT BARCLAY, a rich merchant and grower of rare plants at Bury Hill, near Dorking, and no doubt of others of his patrons, and the year of the collapse of his "*Flora Londinensis*" became also the year of the rise of the

*Botanical Magazine.* The time was ripe for it. It succeeded from the beginning. The first part was published on February 1, 1787. It contained three plates, representing *Iris persica*, *Rudbeckia purpurea*, and *Eranthis hiemalis*, plants by no means new, but probably still rare in the gardens of those days. After that, monthly parts of three plates were issued with great regularity up to CURTIS'S death, twelve parts making a volume. The parts were sold at 1s. each. The monthly sale was 3,000 copies from the start, and we are told that this number was maintained during CURTIS'S life-time. It "placed him in easy circumstances," as his son-in-law, SAMUEL CURTIS, remarked; or, as he himself said, "it brought him Pudding," whereas the "*Flora Londinensis*" had brought him only praise. The plates were dated from "Mr. Curtis' Botanic Garden, Lambert Marsh," up to March 1790, this being apparently the time when he moved his Botanic Garden to Brompton, partly in order to escape the smoke of London—"that enemy," to quote his own words, "which neither time, nor ingenuity, nor industry could vanquish . . . and which proved injurious . . . especially [to] the Alpine ones." The Magazine was now well established and ran a smooth course during the remainder of his life, providing affluence for him and a comfortable inheritance for his family. WILLIAM CURTIS died in July 1800.

So much as to the origin of the *Botanical Magazine*. I will now give the outlines of its further history up to 1920.

During his last illness WILLIAM CURTIS had wisely provided for a successor by entrusting his friend, Dr. JOHN SIMS, with the general management and editorship of the *Botanical Magazine*, the property in the latter remaining in his family; and after a short interval, during which WILLIAM'S brother THOMAS looked after the Magazine, SIMS took over the duties of editor and as such his name appears on the title-page of Volume 15 (1801). SIMS was a medical man and a prominent and very busy member of his profession. As to his claims as a botanist he says of himself, "Having ever made botany his amusement, never his serious study, he has greater dependence upon the continued assistance of his more learned friends." There was at first no change in the style of the *Botanical Magazine*, but the number of plates was increased to four in each part, and the price was raised to 1s. 6d. a part. Later on the number of plates was doubled, so that eight plates appeared in each part, the price apparently being for a time 3s., but eventually 3s. 6d. The number of plates in the volume was not always strictly adhered to: it sank as low as thirty-seven in Volume 23 and rose as high as fifty-four in Volume 22, the average being slightly above forty-five. The demand for more plates was apparently not satisfied with this increase, as is evident from the fact that the Magazine appeared now in half-yearly volumes for the next thirteen years—that is, from 1803 to 1815—offering the public anything between eighty-one and a hundred plates every twelve months (I say twelve months, because the annual issues did not start with the calendar year). It thus happened that the

*Botanical Magazine*, after a run of twenty-nine years (1787-1815), arrived at Volume 42, whilst the number of plates published, which at the close of Volume 14—the last prepared by WILLIAM CURTIS—had been 504, was now, at the end of 1815, not less than 1,770. The sale of the *Botanical Magazine* continued to be satisfactory it seems ; but difficulties arose out of the resignation of the very able artist, SYDENHAM EDWARDS, who had so far drawn almost all the plates, and the appearance of rival publications, foremost among them the *Botanical Register* which EDWARDS himself had started in 1815. Still the Magazine held its own, although no doubt with diminishing lustre and sale. The year 1815 marked a turning-point, in so far as after that year the Magazine appeared in single annual volumes, corresponding in the number of plates for a long time to the half-yearly volumes of the preceding years and sold at the same price. They were issued as a “New Series” with double numbers—the number of the New Series and the number of the whole work. Internally and materially there was no essential change except such as was conditioned by the temporary collaboration of Dr. SIMS’s “more learned friends,” particularly JOHN BELLENDEN-GAWLER, afterwards known as JOHN BELLENDEN-KER, and Dean HERBERT, and by the increased influx of new plants into the gardens, public and private, of the country.

When Dr. SIMS, owing to advanced age, was obliged to resign the editorship in 1826 the situation became critical. At this moment WILLIAM JACKSON HOOKER, Professor of Botany in the University of Glasgow, stepped in and not only rescued the *Botanical Magazine* but put it on a footing in general accord with the great progress botany and gardening had made since the days of WILLIAM CURTIS, and which also reflected the scientific and artistic genius of the man. For the time the *Botanical Magazine* remained the property of SAMUEL CURTIS, a son-in-law of WILLIAM CURTIS, and his name also appeared as that of the conductor on the title-page, but in every other respect WILLIAM HOOKER was the heart and soul of the publication. With him began in reality a second period in the history of the *Botanical Magazine*. Externally it was still the same as it was under SIMS, and it appeared at the same intervals and with the same average number of plates ; nor was the price altered. It was, however, thought advisable to accentuate the change by starting another “New Series” with Volume 54, whilst at the same time continuing the numbering of the volumes from the beginning of the whole work, so that there were now two “New Series” in the field, that of Dr. SIMS (1816-1826) and HOOKER’S. This series ran on to Volume 71, when what was styled a “Third Series”—in reality it was a fourth series—was begun. This was in 1845, when the firm of Reeve Brothers (afterwards Lovell Reeve & Co.) acquired the rights and property in the *Botanical Magazine*, WILLIAM HOOKER continuing as author and editor. WILLIAM HOOKER, now Sir WILLIAM HOOKER, had meanwhile become Director of the newly nationalized Royal Botanic Gardens at Kew, and the connexion between the *Botanical Magazine* and Kew became very close

and intimate, but not formally official. It was as much to the advantage of the *Botanical Magazine* to have the patronage of Kew as it was helpful to the great national institution to possess in the *Botanical Magazine*, with more than half a century of a useful and universally appreciated career to its credit, an appropriate organ for the presentation of its own treasures and those of kindred establishments. The change brought about by this event found suitable expression in the title-page, which, except for minor alterations in the wording and for the necessary changes in the names of the editors, publishers, and printers, had remained so far essentially the same since the foundation of the *Botanical Magazine*. It now announced the Magazine as "comprising the Plants of the Royal Gardens of Kew and of other botanical Establishments in Great Britain," and it proclaimed its affiliation to Kew by a vignette showing a view of the palm-house which was then under construction. As the palm-house was only begun in 1844 and was not finished until 1848, the vignette must have been drawn from the architect's design. It was replaced by a new and very similar vignette, which, however, lacks the fine fountain in front of the palm-house, in 1861, and this vignette appears on the cover and title-page of the present issue. The size of the monthly parts and of the annual volumes, which in the preceding two series contained on the average seven and eighty-four plates respectively, was now slightly reduced, namely, to five or six to the part and to sixty to seventy-two to the volume, the price remaining 3s. 6d. a part. On the other hand, the letterpress was much fuller and in every way richer, and for four years a "Supplement of Botanical and Horticultural Information," called "Companion to the *Botanical Magazine*," was added.

Sir WILLIAM HOOKER died in 1865. He was followed as author-editor of the *Botanical Magazine* by his son, Dr. (afterwards Sir) JOSEPH DALTON HOOKER, who had at the same time become Director of the Royal Botanic Gardens of Kew. The Magazine continued on the lines laid down by his father, in outward appearance, style, size, and price. When in 1878 W. H. FITCH, about whom I shall have more to say presently, withdrew from the *Botanical Magazine*, with which as artist he had been connected for forty-five years and for which he had drawn and lithographed about 2,800 plates, a somewhat difficult situation arose, comparable to that created by the resignation of SYDENHAM EDWARDS more than sixty years earlier; but the difficulty was to a great extent overcome during the following years. Thus nine years later the *Botanical Magazine* entered on its second century to all appearances securely rooted in the splendid home it had found and strong in its tradition and world-wide repute. In 1904 JOSEPH HOOKER resigned the editorship, in which he had been assisted during the last two years by Dr. W. BOTTING HEMSLEY, then Keeper of the Herbarium at Kew and his trusted lieutenant for many years. By that time the *Botanical Magazine* had been in the hands of the HOOKERS, father and son, fully seventy-seven years. It passed now to Sir W. T. THISELTON-

DYER, who had succeeded Sir JOSEPH HOOKER as Director of the Royal Botanic Gardens in 1885, and, after his retirement two years later, to his successor, Dr. (afterwards Sir) DAVID PRAIN. Another "Series," nominally the fourth, was started when Sir WILLIAM THISELTON-DYER became editor, although there was apparently no change, apart from a slight increase in the size of the plates and the fact that they were from now onward strictly limited to sixty in the volume. The new series marked, nevertheless, a break with the past in one particular direction. For sixty years the title-page had announced the volumes as "Curtis's Botanical Magazine . . . by Sir William Jackson Hooker," and afterwards " . . . by Sir Joseph Dalton Hooker," attributing to both authorship and editorship. From now onward the successors of the HOOKERS claimed only the editorship. The authorship and whatever responsibility was connected with it passed to, or was shared by, a number of writers, practically all on the staff of the Kew Herbarium. It was probably the best decision in the circumstances, and it promised, under a strong leadership, to attach the Magazine still more intimately to the great establishment. Somehow, however, the public interest in, and the demand for, the *Botanical Magazine* began to wane, whilst the increasing cost of its production, and finally the disastrous after-effects of the Great War, made it very difficult if not impossible to balance its accounts on that item. A reduction of the yearly issue from sixty to forty-four plates took place, and the monthly issue was replaced by a quarterly one, but neither had the desired effect, and the publishers saw themselves finally compelled to terminate the "Fourth Series" with Volume 16 (1920)—the 146th volume of the whole work. This is, in brief, the history of the *Botanical Magazine* up to the point where the Royal Horticultural Society took upon itself the burden and the honour of the continuation of the work.

I shall have to speak now of the *technical production* of the *Botanical Magazine*. From the very beginning the *Botanical Magazine* has been a pictorial publication. On the original title-page it was announced as a "*Display of the Flower Garden, of ornamental Foreign plants cultivated in the open ground, the green-house and the stove . . . accurately represented in their natural colours.*" The text as far as it contained the names was a necessary, and as far as it recorded their classification, native country, etc., a very valuable, adjunct, but an adjunct all the same. To justify the existence of the Magazine and to make it a success in these circumstances it was essential to concentrate on the judicious selection of the objects to be figured and on their adequate representation by well-executed pictures or portraits. Of the selection I shall speak later on. It was not difficult in the early days of the *Botanical Magazine*. The gardens were full of beautiful and uncommon flowers which had never before been represented in their natural colours, and it was therefore for a man like CURTIS, who had taste and wit, only necessary to find the artists who could depict them—first the draughtsman, then the engraver, and lastly

the colourist. I say the engraver, because lithography was not yet in the field. It has been suggested that some of the plates of the first volumes of the *Botanical Magazine* were drawn by CURTIS himself, but this is very uncertain. We know that from the early days of his literary career he availed himself of the help of artists for the illustration of his works. As his limited means prevented him from employing continuously acknowledged experts, such as JAMES SOWERBY, who supplied in all sixty-seven drawings to the *Botanical Magazine*, he had to look out for younger men of promise whom he might train and mould for his purpose. In this he had the good fortune of attaching to himself a gifted lad who was destined to become in a short time his chief artist. The lad was SYDENHAM EDWARDS, the son of a schoolmaster at Abergavenny in Wales. CURTIS had seen some samples of his work. He called him to London, had him instructed in drawing and painting, and trained him himself on his own lines. He became very soon extremely efficient, and he had when in 1815 he left the *Botanical Magazine* almost the whole of the plates of the first forty-two volumes to his credit—in all nearly 1,700 numbers. Many of these drawings are at present in the Kew collections; others are still unaccounted for. They are remarkable on account of their finish and accuracy, and they show a commendable grip of the specific characters of the plant depicted, so that there is mostly no difficulty in recognizing it although there are no analyses, and the descriptions add little that is not displayed in the figure. Artistically they are pleasing on account of the unlaboured simplicity of the execution and, as a rule, the clearness of the colours. The merits of EDWARDS's original drawings are well reflected in the coloured engravings as we know them from the issued plates. For some time EDWARDS himself engraved his drawings, but from Plate 191 onwards SANSOM's name appears on the plate as that of the engraver, at first intermittently, then regularly. CURTIS was not less fortunate in the assistance he derived from WILLIAM GRAVES, who from the beginning acted as his colourist. EDWARDS's method of treating large surfaces of a simple pattern so that a single wash was mostly sufficient facilitated the colourist's work very much. At the same time complex patterns and the delicate shading off of the colours so commonly found in flowers were not neglected and, in fact, they were sometimes rendered really charmingly. Many of the paints have stood the test of time extremely well, but the whites and some of the heavy reds have come to grief.

I have already said that EDWARDS severed his long connexion with the *Botanical Magazine* in 1815, and SANSOM, the engraver, seems to have left at the same time. GRAVES, however, continued his services for many more years. With EDWARDS's resignation there began a time of artistic deterioration. First various artists were employed. Then from 1819 onwards a certain J. CURTIS, who was, however, not a member of WILLIAM CURTIS's family, became responsible for the preparation of the drawings for the next seven years, whilst an

engraver named WEDDELL looked after their reproduction with indifferent success up to 1824, when he was succeeded by SWAN.

With the year 1827 the HOOKER period, which carried the *Botanical Magazine* to the zenith of its success, began. WILLIAM HOOKER became editor that year, but his initials appear on a number of plates in the volume for 1826, heralding the great change that was to come. For a number of years HOOKER was author, editor, and artist. Only a man of so extraordinary a power of work could have undertaken and carried through the enterprise along with all his numerous other duties. Correct, clear-cut, and refined as most of EDWARDS's plant-portraits were, HOOKER's drawings showed a boldness of conception and an emphasis, and at the same time ease of execution, not attained so far and exceeded afterwards only in the best work that WILLIAM FITCH did. There was also a freer use of the space available, and yet room was found for analyses of which there had been practically none so far. The figures were still engraved, SWAN continuing his connexion with the Magazine as long as it remained SAMUEL CURTIS's property. But even HOOKER felt the pressure of work becoming too much. He needed assistance, and he soon found it in the person of a young artist, WILLIAM HOOD FITCH, who was the son of a book-keeper to a firm of Glasgow flax merchants, and was then drawing patterns for calico, muslins, etc. As WILLIAM CURTIS had drawn young EDWARDS to his side and trained him to be his artistic collaborator, so did HOOKER with WILLIAM FITCH, who, in ready response, soon became his most successful interpreter. He brought the free and easy style of HOOKER's draughtsmanship to perfection and, possessing at the same time a keen eye and a clear grasp of plant-forms, he became for the time the undisputed master of the art of botanical portraiture. His earlier drawings—his first contributions to the *Botanical Magazine* date from 1834—which had still the touch of the tyro, were etched by SWAN, and they hardly gained thereby. FITCH, however, learned the art of lithography, which was now in general vogue, and from 1845 onward he was draughtsman and lithographer combined until his retirement in 1877. The transition from the harder delineation of the engraver to the softer representation on the stone added much to the beauty of the plates. Moreover, FITCH had a marvellous power of visualizing plants as they lived and of retaining their image in his memory. This emboldened him rather to treat his originals as sketches than to work them into finished pictures, with the result that when finally drawn on stone they underwent a certain generalization in which the type of the species came to life and took the place of a photographically true portrait. His colouring was equally bold, which must have been a veritable boon to the colourists, who could mostly get the desired effect with simple washes.

When FITCH left, Sir JOSEPH HOOKER, who was then responsible for the Magazine, found himself in a difficult situation. I have said enough to make you understand what the loss of this artist must have



meant to the scientist-author. It could hardly be expected that his post could be filled early and easily. It was a question of trying here and there, and eventually of training another artist and slowly fitting him into the vacated office. JOSEPH HOOKER was on the whole fortunate in bridging over the time which had naturally to elapse before he could feel himself suited once more with an efficient artist. It is true the execution of the pictures, measured by the standard set up by FITCH, suffered in the interval, sometimes more, sometimes less; but some drawn by HOOKER's daughter, Mrs. THISELTON-DYER (now Lady THISELTON-DYER), are, standing by themselves, very creditable productions. Gradually a new artist emerged from the period of experiment. It was MATILDA SMITH. HOOKER, who was a man of artistic genius, himself instructed her, and before long she was the chosen illustrator of the *Botanical Magazine*, which now for many years ran a smooth course, although bereft of the master-hand of the earlier artist. Her work is so well known to you that I need not dwell on it. There is, however, one aspect of this last period to which I ought to refer, and one name which in fairness should be mentioned. With WILLIAM FITCH not only the draughtsman was lost, but also the lithographer. This was serious if the style in which the original drawings were prepared was to be continued; if on that basis the work had to be divided now between the artist who drew and the artist who transferred the drawing to the stone there had to be intimate and sympathetic collaboration between the two, in which the one was allowed a certain measure of artistic suggestion, whilst the other had to find the definite lines and shades which the print required. It was necessary that the lithographer should enter into the spirit of his colleague and that he himself should be able to reconstruct the model in his mind. This capacity JOHN NUGENT FITCH, a nephew of WILLIAM FITCH, who succeeded WILLIAM FITCH as lithographer, possessed in a high degree. His lines suggested the vigour of his uncle, whilst he had at the same time a good eye and a good understanding of plant-forms. The result of this happy collaboration was that the difference between the production of the *Botanical Magazine* before and after 1877 was for a very long time little felt. The younger FITCH retired from the *Botanical Magazine* early in 1920, and Miss SMITH struggled along alone under conditions which had become somewhat difficult until the end of that year.

I have to deal now with what I might call briefly the aim and the policy of the successive editors of the *Botanical Magazine* and the realization of their aim. I have already referred to the end WILLIAM CURTIS had in view when in 1787 he started the *Botanical Magazine*. It may, however, be useful to repeat it, and for this purpose I will summarize the very long statement contained in the title-page of the first volume. The *Botanical Magazine* was to be a serial of plant pictures drawn and coloured from life. It excluded native plants, but was open to any other plant as long as it was amongst the

"most ornamental" and in actual cultivation either in the open ground or in the greenhouse or the stove. The pictures were to be accompanied by letterpress giving (1) the name of the plant and its place in the Linnean System, (2) the generic and specific diagnosis, (3) the native country, (4) the time of flowering, and lastly (5) notes on the cultivation of the plant. At the same time its scientific character was most emphatically proclaimed. It was "intended for such Ladies, Gentlemen and Gardeners as wish to become scientifically acquainted with the plants they cultivate." The object to be pursued and the way to realize it were thus clearly stated, and they have, apart from such modifications as were conditioned by the progress of science, steadily been adhered to in principle, and much of the strength of the position which the *Botanical Magazine* has occupied in botanical literature is due to that fact. Neither CURTIS nor SIMS was a systematist, as we understand the term, nor had they a really broad and general knowledge of plants. They leaned to a great extent on others, and for a while not much original work, apart from the description of new species, was offered, and the letterpress remained generally meagre; but in 1801 SIMS felt obliged to apologize for the occasional introduction of "somewhat more of a critical discussion," adding with some humour "that our botanical friends will easily perceive that the subject demanded it, and whilst the price is not thereby increased it is not apprehended that anyone will complain." The break with the Linnean System came very gradually, if not late. It was applied exclusively up to the end of 1840, and after that bracketed with the Natural System of the French school, taking the first place for another four years, but relegated to the second place when the Magazine became the property of REEVE BROTHERS in 1845. It did not, however, disappear until 1871, under JOSEPH HOOKER's editorship. Yet WILLIAM HOOKER had in 1833 prepared the ground for the change when he published a "New Edition with amended characters of the species. The whole arranged according to the Natural Orders." He seems to have contemplated to reissue the plates published so far and to arrange them according to the Candollean System; but the venture did not get beyond the first volume, which contained 119 plates, beginning with Ranunculaceae and ending with Sarraceniacae. I need hardly remark that the Candollean System was replaced by that of BENTHAM and HOOKER's *Genera Plantarum* until quite recently, when ENGLER's System began to make its influence felt. I have already observed that analyses were more or less regularly introduced with the advent of WILLIAM HOOKER's editorship. Until then they were quite exceptional and practically confined to Dean HERBERT's and to GAWLER-KER's contributions, and these dissections were scanty and mostly superficial. It may have been this absence of a more thorough representation of the structure of the plants which induced THORNTON, in his otherwise very sympathetic "Sketch of the Life and Work of CURTIS" (1805), to remark: "It has since been recommended with

more propriety, as was his *Flora* [Londinensis], as a drawing-book for ladies." This sneer sounds odd in our day, when botany as a science and gardening as an art are practised by men and women both as a hobby and as a profession. Nor was the sneer quite deserved, as those who have occasion to refer to the earlier volumes will realize. Most of them still stand the test of serious scrutiny and as guides in the interpretation of the contemporary literature. On the other hand, the consequent introduction of this feature was indeed a necessary condition if the status of the *Botanical Magazine* as a scientific publication was to be maintained, and it had to be developed in the measure as scientific progress demanded, not indeed as a primary object, but as an auxiliary without which the illustrations might really be in danger of falling to the level of a picture-book. To have insisted on that was one of the great services which WILLIAM HOOKER did to the *Botanical Magazine*, as he lifted it at a bound to the level which botanical science had reached in his days. Since then analyses have been an essential part of the plates of the *Botanical Magazine*, either to reveal what is otherwise hidden or to display to the unaided eye the microscopically small by enlarged figures, and generally, to use a phrase of WILLIAM HOOKER's, "as a means of attaining to the most perfect acquaintance that human limits will allow with the vegetable productions of our globe."

From the beginning there was no geographical limit set to the inclusion of plants in the *Botanical Magazine* as long as they were foreign. This limitation was natural, as the study of the home flora was to proceed on different lines. That, apart from it, the editors should be untrammelled in the choice of their subjects, except for the claim of the plants to ornament and, within limits, to curiosity, was equally natural. The cultivation of outdoor plants was open to all with a suitable piece of ground; the greenhouse and conservatory were within the reach of many. The hothouse or stove was indeed limited to a few private persons and rather a privilege of the rich and of the great commercial establishments and public institutions, but it was available anyhow to an extent which would never have justified the exclusion of plants on the score of the impossibility of growing them. It was, then, only a question of drawing on the countless vegetable treasures which were scattered all over the globe, and this in turn was a question of exploration, of horticultural enterprise, and of the skilled application and the development of the art of gardening. It would be interesting to tabulate the plates by the countries which the plants figured represent, as the table would reflect the sequence and the origin of the principal waves of enterprise and fashion which governed the introduction of garden plants, but it would lead me too far away. I would only observe that the first years of the *Botanical Magazine* were years of preparation, when it had to find its footing and feel its way. Of the plants figured in the first three volumes almost one-half were European plants, mostly alpinists and Mediterraneans; the near

Orient added almost one-fifth ; America about one-sixth, the northern and the southern half in equal shares ; South Africa, whose unlimited treasures MASSON was already tapping, one-eighth ; whilst the East, India, China, and Japan were hardly drawn upon. But in the last of CURTIS's own volumes the European element was already reduced to one-fifth, whilst the South African flora began to claim its full share, being represented by a quarter of the plates, America retaining its relative hold, and Australia just coming in. The next fourteen years, 1801-1815, was the time when the South African plants invaded the pages of the *Botanical Magazine*, the Iridaceae alone claiming about 170, or over 13 per cent., out of the 1,263 plates of that period. Australia, too, got its share, but on a much more moderate scale, whilst America, both the North and the South, held its own. I have not had time to make any more counts, but I may just mention that Miss BURFORD extracted for me the plates which have been devoted to the illustration of North American plants during the whole career of the *Botanical Magazine*. They number almost exactly a thousand out of a total of 9,000, a telling proof of the interest which the Magazine has taken in the flora of that continent. In the eighty years during which the *Botanical Magazine* was affiliated with Kew, the area from which it drew the supply for its pages increased steadily until it was world-wide. There is no geographical region or province which has not yielded one or more or even very many objects for its artists and its authors, and they are far from exhausted. The tropics overflow still with untold numbers of plant-forms of beautiful design and of ingenious structure whose final meaning we cannot yet even fathom. The temperate regions of the globe north and south, east and west, harbour still many a gem which we might bring to our shores and plant and nurse in our gardens, so that we might enjoy at our leisure their charms and learn their lessons of harmonious and wise structure. If it is not given to all of us to enjoy the pleasure and the happiness of raising those lovely children of Nature with our own hands and under our own eyes, there are the generous owners of parks and gardens and the public institutions which admit us to see and to admire and, seeing and admiring, to share with them all that is sweet and good in the intimate contact with Nature, the great mother of us all ; and behind all that, so I conceive it, should stand the *Botanical Magazine* as pioneer, as leader, as teacher. There is indeed, then, no need for the question put in the memorandum by the publishers of the last quarter of the *Botanical Magazine* for 1920, "whether the work still fulfils a sufficiently useful botanical and horticultural purpose to justify its continuance, and if so under what conditions it may be possible to do so." The *Botanical Magazine* has always had its mission ; it has fulfilled it, now more, now less. Every human enterprise has its ups and downs. The Magazine has still its mission, and it is our duty, as those who have taken it over and are responsible for it, to further it in the

spirit of the times and by all the means which modern equipment and modern science offer. It ought to be a matter of national pride to support it, for as the students of plant-life and the lovers of plant beauty outside these Isles have for more than a hundred years relied on the inspiration and help they receive from the *Botanical Magazine*, so they still do and will do in the future as long as we steer the ship in the old course.

## SOME ALPINES I HAVE KEPT ALIVE.

By CLARENCE ELLIOTT.

[Read June 9, 1925; Mr. W. A. BILNEY, V.M.H., in the Chair.]

My original idea was to call this lecture "Some Alpines I have Killed." But unfortunately that title had already been used by Mr. LLOYD PRAEGER for a recent article in *The Garden*. The plants, moreover, that I have killed would make too vast a subject for a single lecture. It is terrible to think of the plants I have killed as a gardener, a collector and an experimenter. I propose therefore to tell instead of a few of the Alpines I have managed to keep alive.

As a general principle in gardening it is a sound plan to find out what plants do best in your particular soil and climate, and to grow them for all you are worth. By this means your garden becomes a flamboyant triumph, and you yourself acquire a reputation for great skill as a cultivator. And yet every gardener who is worth his salt develops, sooner or later, an itch to achieve the difficult or the impossible.

The man who lives on the Chalk Downs is pretty certain to hanker after Rhododendrons and Heathers; the man who has nothing but a window-sill in the heart of the City of London wishes to have a shot at Edelweiss; while the man who measures his greenhouses by the acre and counts his gardeners by the score, he too has his garden ambitions, though too often they dwindle to a pathetic attempt to persuade hirelings to grow the things he really likes, or *not* to grow the plants he detests.

If we stop to think why we garden, I suppose the plain answer is "for recreation." Some folk take pleasure in producing a beautiful effect, others in overcoming difficulties in cultivation. In rock gardening there is plenty of scope in both these directions, and in rock gardening I think the greatest satisfaction is felt when one has discovered the trick by which some plant of the highest beauty, but of hitherto uncertain temper, may be made to flower as though it liked it. Think how it would feel to conquer *Eritrichium nanum*! You see it in the High Alps, solid cushions of stemless Forget-me-not, surely one of the loveliest plants on earth. And it does not *look* difficult as you see it growing there. In the rock garden you make its stony bed just as you saw it in nature, you plant it in an atmosphere of prayers and theories, you lavish on it all the professional care of not less than two trained nurses—not to mention an antiwet-nurse, for it detests winter rains—you tend it with your best moraine bedside manner, and then, to complete the medical parallel, the operation being perfectly successful the patient unfortunately dies. The little

blue-devil *Eritrichium* is perhaps the most determined dier in cultivation, and so far it has beaten us all.

Let us turn to the less painful topic of Gentians. Folk seem to be very puzzled and bothered by *G. verna* and *G. acaulis*, judging by my post-bag. I am always very happy to try to help correspondents by letter, but I shall be happy too if I can lessen my labours by broadcasting my views on Gentians *verna* and *acaulis* through the R.H.S. It would seem that almost anyone can grow *G. acaulis*, but that though it may grow it will not always flower. *G. verna*, on the other hand, is not always easy to grow, but, provided you do grow it, it is pretty certain to flower. There is a mystery about *G. acaulis*. Nobody seems to know what exactly it is that makes it flower or not flower. The soils that suit it are strangely various. In my stiff yellow loam it flowers magnificently, and so it does in some thin heathy soils, as at Hindhead. At Kew it refuses to flower. A popular theory is that you should walk upon the plant, or put a garden roller over it. But I believe that the whole staff at Kew, and the Office of Works as well, might walk on *Gentiana acaulis* in the Kew soil and yet fail to produce a single blossom. Another theory is that the flowering depends upon the presence of some bug or microbe in the soil, and this seems to me very probable. In practice a fairly safe way to success is to dig out a hole, 18 inches deep and as big as may be, fill in with soil in which *acaulis* is known to flower well, and plant in that. This I have actually proved.

For *G. verna* a good soil is a mixture of equal parts of the best loam you can procure, leaf-mould, silver-sand, and sandstone chips, or smashed-up flower-pots. But more important even than the particular sort of confection you plant in—and there is room for much latitude in this matter—is the question of roots. *G. verna* is one of those plants which must start life with roots. And too often under cultivation it does not. If you buy *G. verna*, insist on roots, and if you do not get them send it back—even if it's me! Given proper roots I do not consider it a difficult plant to grow.

A Gentian which worried me for a long time was the superb *G. sino-ornata*. At first I was led to suppose that shade was the sole secret of success, and shade I gave it, without bothering much about soil—and also without success. Then someone told me that all it required was a full open sunny position in full loam. This too I tried, and every plant died. In scree it was no more successful. Then I planted some out in a rock garden I was making near Sheffield. The soil was the sort of soft loam in which *Rhododendrons* and *Heathers* seed about spontaneously. Here *G. sino-ornata* ramped freely and flowered gloriously. Later I had an equally satisfactory success in Lady HUDSON's rock garden at Crowborough, and here the soil was of the same soft, heathy nature. I was getting on the track of what the plant wanted, and at once started growing it seriously at Stevenage, in made-up beds of peat and leaf-mould. I have had no further trouble with *sino-ornata*.

If your soil grows Rhododendrons and Heathers it will almost certainly grow *sino-ornata*. It may be well to soften and enrich the natural loam with peat or leaf-mould, for the roots of the plant are themselves soft and juicy. If, on the other hand, your soil is the sort of strong loam that Roses and Carnations enjoy, then it is almost certainly not safe and suitable for *sino-ornata*. But it is then an easy matter to make up a soft, rich, peaty bed such as I have described.

At Edinburgh Botanic Garden they grow *G. sino-ornata* in the rose beds. This fact has been reported in the Press, but is really rather misleading. The soil there is essentially a Rhododendron soil. Roses grow *in spite of* the soil. As a result I received numerous inquiries for the new Chinese Gentian for carpeting rose beds. I knew a man who grew *Omphalodes Luciliae* as an edging to his carriage drive, yet one would hardly recommend it as an edging plant for general use! It was an exceptional case, accounted for, probably, by some purely local peculiarity of soil. For those who do not know the plant I may briefly describe it as like a Forget-me-not, with smooth glaucous-grey leaves and greatly magnified flowers of a soft, delicate sky-blue—a most lovely thing. At first *O. Luciliae* worried me a good deal, as it must have worried many others, to grow. Now, however, I manage “to keep it alive,” in fact I may say it does pretty well, so I offer my experience for what it is worth. In the beginning, many years ago, I tried my first plant of *O. Luciliae* in a funny little scree of granite chips in full sun. But here it lingered, a woeful little half-corpse, “by the river’s brim (the River Styx), and it was nothing more.” Then one day at Mr. MAURICE PRICHARD’S Nursery I saw what appeared to be a little pile of builder’s mess, broken bricks and mortar rubble, heaped against the north side of a wall, and draped all over it was *O. Luciliae*, looking as prosperous as a patent-food baby. On this broad hint I shifted my plant to a position in limestone scree under the lee, due north, of a limestone rock. There the plant has prospered ever since, and has multiplied exceedingly. A week or two ago, however, my pride in my *Omphalodes* was severely jolted. I was shown half-a-dozen pot plants which had been grown *in the middle of Hyde Park* by Mr. HAY. I never saw such plants. They were as unbelievably sleek as cabbages in a seed catalogue. I have not yet had an opportunity of asking Mr. HAY what his method of cultivation is, but I have heard it whispered that at any rate he gives them rich living, as opposed to my rather austere scree diet.

A plant which I had long admired and wanted to grow was *Pyrola rotundifolia*. It is a most beautiful thing, with rounded, glossy, leathery leaves, and with spikes of white flowers extraordinarily like Lily of the Valley both in appearance and in their heavy fragrance. It is a rare British native. For some reason or other I had always imagined that it was frightfully difficult to grow, and certainly the few specimens I had seen in captivity had caused me to be chary of the plant. I had met it wild in the Alps once or twice, but its rather



vague roots still further discouraged me. And then two years ago I went over to the French coast for an Easter week-end to hunt some woods in which *Pyrola* had been reported to me. I found it very abundant, growing in thin woodland of Poplar and Alder, with an undergrowth largely composed of Privet. Always and everywhere it was growing in absolutely pure leaf-mould—nothing else. I collected a lot of the plant, and found the long, thin, fibreless roots, like meandering spaghetti, much less tiresome to get up than I had expected. Taking the hint from its leaf-mould habitat, I grew *Pyrola* in pots (and also in beds) of pure leaf-mould, and really it has astonished me with the alacrity with which it took to domestic life. It has run about freely, and flowered profusely, and has quite dispelled all my old fears as to its reputed ill-temper. *Pyrola rotundifolia* would be an ideal plant to carpet the ground under choice Rhododendrons if it were given 6 inches or so of pure leaf-mould to run in. It makes, too, a delightful summer substitute for Lily of the Valley.

I should like to say a word about that rare old hybrid pink *Dianthus Atkinsonii*. It is not an Alpine, of course, though it often inhabits the fringes of our rock gardens. This brilliant invalid in blinding scarlet is a very old garden plant, but it is so shy in giving cuttings, and it so exhausts itself with wildly profuse flowering, that it is surprising that it was not lost to cultivation ages ago. But it is such a good thing, that although it must have been on the verge of extinction many times it always seems to have found a rescuer who kept it going. I have already, in another place, told how good cow dung is for *D. Atkinsonii*, but I will repeat the story here and now, as anything one can do to keep the plant from becoming lost to cultivation is worth while. My plan is, when planting, to dig a hole about 9 or 12 inches deep and put at the bottom of it a good big lump of pure cow dung, cover with a sprinkle of soil, and then plant. It is quite extraordinary how *Atkinsonii* responds. It is a good thing also to keep a plant in reserve from which to propagate. Left to itself it rushes into flower, every shoot becoming a smother of blossom, and not a cutting can be found. Pick off all the blossoms, cutting down the flower stems half-way, and you will then get plenty of cuttings, which are not at all difficult to strike in a pan of silver-sand. *D. Atkinsonii* is one of those hybrids which are absolutely sterile. It never sets a single seed, never has, and probably never will, though seed is sometimes offered for sale!

Whilst on the subject of keeping plants alive I will draw attention to an odd trick of two plants of suddenly shamming dead in the middle of the summer. These two humorists are *Oxalis lobata* and *Saxifraga granulata* fl. pl. *Oxalis lobata* comes up in spring with a charming crop of emerald-green wood-sorrel leaves. Then in high summer these suddenly die clean away and one sees nothing more of it till about September, when up comes a fine crop of charming little flowers of a fine deep golden colour and satin texture. The old double

white Meadow Saxifrage (*S. granulata fl. pl.*) throws up its sturdy flower stems about the end of May, and a week or two after flowering the whole plant turns brown, shrivels, and entirely disappears. At this point you write either a very nice or a very cross letter to your Alpine nurseryman and tell him that the plant he sent you has suddenly died. He writes you a patient letter explaining that this really is the natural habit and peculiarity of the plant. For several weeks, perhaps, you feel a little injured that the nurseryman did not think of some more plausible excuse for his plant dying than that—and then, lo, up comes the Saxifrage with a crop of lush green leaves as fresh as paint! The root system of this Saxifrage is rather curious, for it consists of a mass of little bulbs or tubers—or are they corms? The letters saying that it is dead start arriving about the second or third week of June, according to the weather, and the apologies, if any, some six or eight weeks later.

One more plant I would like to tell of, partly because I had great difficulty in making it happy at first—and many other folk have found it difficult too—and partly because I learnt the trick of growing it in rather an interesting way. I came by *Pentstemon Davidsonii* many, many years ago under the name *Pentstemon Menziesii Douglasii*. I now call it *Davidsonii*, as that is the name by which it is most widely known, though it has been officially pronounced by Kew to be *Pentstemon rupicola*. I tried the plant in many different soils and positions, and somehow never got it to do very happily. Then I showed a plant of it at the great R.H.S. International Show in 1912, and there it was noticed by a clergyman, who told me he had seen it growing wild on Mount Rainier in Washington. And he told me *how* it grew, in crevices of the cliffs, spreading flat to the rock and looking like great blotches of glowing ruby paint. That gave me the clue. Treated as a saxatile plant, or a wall plant, it is magnificent and not difficult. The ideal place for it is one of those delightful natural holes that occur in the water-worn limestone, and the ideal hole is one in which has been growing some wild, self-sown fern or grass. You pull the wilding out and plant the *Pentstemon* in its place, and you may know that where a fern or a grass has elected to grow there your *Pentstemon* will flourish too, though sometimes such crevices are distinctly small and narrow and it is essential to start with a very small plant. Nurserymen, however, have been known to send out such plants. This rare little rock *Pentstemon* is prostrate in habit, woody of stem, with small rounded leathery grey leaves and large blossoms of a brilliant juicy ruby red.



FIG. 22.—SAXIFRAGA × BOYDII.

[To face p. 48.

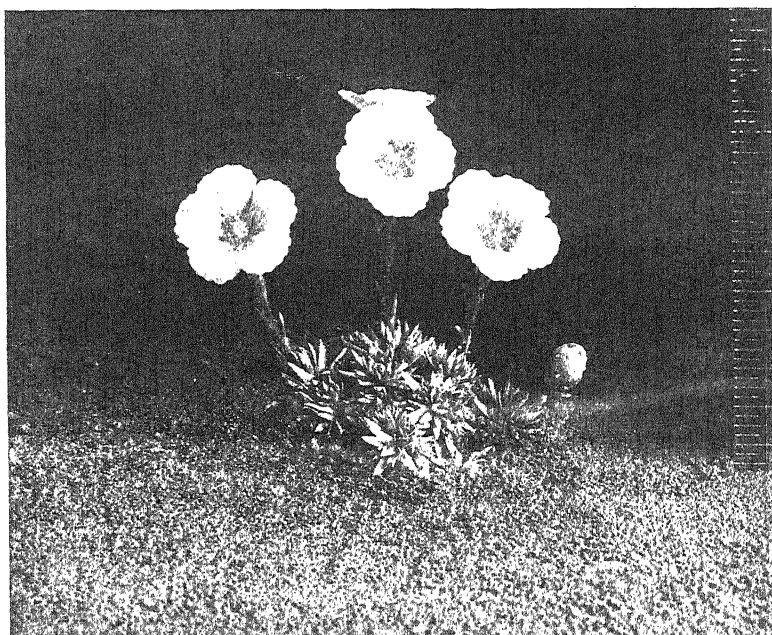


FIG. 23.—SAXIFRAGA × 'FALDONSIDE' AT EDINBURGH.

## HYBRID SAXIFRAGES.

By MURRAY HORNIBROOK.

SAXIFRAGES hybridize so freely, and the ever-increasing resulting new forms are so numerous, that any magazine article dealing with them must necessarily be selective and somewhat sketchy in parts; and in the last few years the number of new introductions has been so large that one has not been able to keep trace of them all, nor has sufficient time elapsed since their introduction for one to be justified in passing a final judgment upon them; therefore upon the present occasion I must be forgiven if I devote more space and consideration to those forms which have proved their worth rather than to those which are little more than catalogue names.

The forms in cultivation prior to 1890 were neither numerous nor particularly interesting, but the introduction of Mr. BOYD's hybrids about 1890 caused a considerable sensation and certainly gave a great impetus to hybridization, and the results have been flowing in upon us ever since.

The history of the Boyd plants is very interesting and is not generally known. *Saxifraga*  $\times$  *Boydii* (fig. 22) was a solitary seedling presumed at the time to be a hybrid of two white-flowered species, but upon its flowering for the first time at Kew the late Mr. DEWER suggested its parentage to be *S. Burseriana*  $\times$  *aretioides*. I see that ENGLER in his recent monograph gives the parentage as *S. aretioides*  $\times$  *marginata* var. *Rochelliana*. In a work of such magnitude as the monograph in question one is sometimes forced to the conclusion that the author has been so preoccupied in verifying his endless authorities that he has not had the time to examine the forms themselves; but if there was ever any doubt as to the correctness of DEWER's diagnosis it is likely to be set at rest when one examines the seedling of *S.*  $\times$  *Boydii*, *S.*  $\times$  'Faldonside,' for the seed of *S.*  $\times$  *Boydii* was saved and sown and several more or less distinct forms resulted, of which *S.*  $\times$  'Faldonside' is the best known. This form has the widening veins at the edge of its petals similar to those of *S. aretioides*, and the shape of its flowers with their beautifully crimped petals is similar to those of *S. Burseriana*—in fact *S.*  $\times$  'Faldonside' takes us further, for as these crimped petals are one of the distinguishing features of the variety of *S. Burseriana* known as 'var. *major*,' we may fairly assume that the parentage of *S.*  $\times$  *Boydii* was *S. aretioides* and *S. Burseriana* var. *major*.

Several other seedling forms of *S.*  $\times$  *Boydii* were sent out. I had one rather indistinct form—called, I believe, *S.*  $\times$  *lutea*—and another I got from Glasnevin with tighter cushions and smaller flowers on shorter stems, but I have not seen either in cultivation for a long time, and only the exquisite gems *S.*  $\times$  'Faldonside' (fig. 23) and

*S.* × 'Cherrytrees' (fig. 24) remain. The latter is now extremely rare, its place in gardens being almost invariably taken by a shameless impostor—*S.* × 'Cherrytrees' of the trade (fig. 25). I do not know who was responsible for foisting this upon us; it is not even a descendant of *S. Burseriana* var. *major* and *arctioides*, but of *S. Burseriana* (type) and *S. sancta*, and the result is a strong growing, straggly green cushion as sparing of its flowers as was the old typical form of *S. Burseriana*. It is not the least like the true *S.* × 'Cherrytrees' and is nearest to *S.* × *Elizabethae*.

Comparing *S.* × *Boydii* and its two children, one finds that its flowers are the deepest yellow, its petals very full and round and nearly overlapping; those of *S.* × 'Faldonside' are much paler, its petals beautifully crimped and absolutely overlapping. The silvery cushions of *S.* × 'Cherrytrees' are much tighter, its flowers are more open and star-like, but their colour is an almost indescribable pale lemon-green; once seen this form can never be mistaken for any other.

For the purpose of comparison I have been fortunate enough to secure photographs of the three forms of *S.* × *Boydii* and of the false *S.* × 'Cherrytrees.' Those of *S.* × *Boydii*, *S.* × 'Faldonside,' and the false *S.* × 'Cherrytrees' come from the Royal Botanic Gardens, Edinburgh, that of the true *S.* × 'Cherrytrees' from Messrs. STORMONTH'S Nursery at Kirkbride, Carlisle.

I note in some gardens that the shy-flowering impostor is already being replaced by *S.* × *Elizabethae* and even by *S.* × *Godseffiana*. Its total loss will not be mourned!

All these *Boydii* hybrids are difficult plants to keep, *S.* × 'Cherrytrees' especially so. A few years ago there were some fine pans of it at Glasnevin, but they suddenly died off. Any success I had with them resulted from constant division and replanting; old specimens almost invariably died, and rarely can anyone have had the good fortune of Herr E. HEINRICH of Munich, who grew tufts of *S.* × *Boydii* so large that he was able to divide one into 150 plants!

Two more of Mr. BOYD'S hybrids must be noticed. *S.* × *Boydii alba* is of different parentage, probably *S. Burseriana* and *S. marginata*; it is rather loose and straggly, but it is a willing little plant, easy to grow, and one of the earliest to bloom.

The last of Mr. BOYD'S plants was for a long time wrapped in mystery. It can still be found in a few old-fashioned nurseries as *S. Burseriana multiflora*, and as such I got it, but in reality it is a free-flowering form of *S.* × *Salomonii* (fig. 26).

Now *S.* × *Salomonii* is an old friend. It was introduced—I think about 1894—by SÜNDERMANN, and its parentage was given as *S. Burseriana* × *marginata* var. *Rochelliana*, but its *Burseriana* parent must have been the old typical form, such as we received before its better forms were in commerce. It grew fairly well, but was a shy flowerer, and the old *S.* × *Salomonii* certainly followed it in this respect. It made beautiful tight cushions of silver-blue, but its white flowers on crimson stems were few and far between. I grew it for years

simply for its beautiful foliage, and I see in early editions of "The English Flower Garden" that ROBINSON describes it as "making strong growth with large white flowers, but too scanty for a fine effect." Then one day I saw my *S. Burseriana multiflora* in flower and found it as near as possible identical with *S. × Salomonii*, except that it absolutely smothered itself with blossom. I grew plants of it and of *S. × Salomonii* side by side in identical conditions with every season the same result.

I traced this form to BACKHOUSE'S Nursery, and after many inquiries I at length got its history from Mr. W. A. CLARK; he informed me that it came to BACKHOUSE from Mr. BOYD as a seedling form with the other Boyd hybrids and was duly propagated. It so happened that at the same time BACKHOUSE had a collected form of *S. Burseriana* which threw up flower-stems bearing more than one flower (as var. 'Gloria' occasionally does), and this he distributed as *S. Burseriana* var. *multiflora*; but the young plants of this got mixed up with those of the Boyd seedling, and they were both distributed under the one name. Being the stronger Boyd's seedling eventually survived to the exclusion of the true *Burseriana* form, and so it has remained under this name for very many years. But recently, from descriptions of alleged *S. × Salomonii* in the Press, it is obvious that the free-flowering Boyd seedling is unconsciously ousting the original *S. × Salomonii* from our gardens, and no doubt in course of time the shy-flowering form will disappear.

Now it is fairly clear from what appears to be the parentage of *S. × Boydii* that Mr. BOYD was hybridizing with the free-flowering *S. Burseriana* var. *major*, and that made all the difference between his plant and *S. × Salomonii*.

Mr. BOYD's seedling must have been distributed as early as, or possibly earlier than, SÜNDERMANN's, but the name *S. Burseriana multiflora* of course cannot stand. Nor, having regard to its similarity to *S. × Salomonii*, can any new name be given to it, but at least it is due to this wonderful free-flowering form that its identity should not be absolutely lost. So in the future it is to be hoped that gardeners who find that the plant they grow as *S. × Salomonii* smothers itself with flowers instead of sending up an odd flower-stem in a wide expanse of cushion will distinguish it by calling it *S. × Salomonii*, Boyd's variety.

In later days we have got from *S. Burseriana* a multitude of hybrids, some of which are quite first-class.

*S. × Obristii* (*Burseriana × marginata*) is not far from *S. × Salomonii*, with looser rosettes and stout white flowers. *S. × kestonensis* is possibly of the same blood, but in this case the rosettes are nearer to *S. Burseriana*. Yet another form of the same parentage lands us in a difficulty; its foliage is very compact and silvery and it has abundance of white flowers on crimson stems, and is one of the best forms resulting from this parentage. I received it first from SÜNDERMANN about 1912, under the false name of *S. × Petraschii*. From Kew I received

it as *S. × Sündermannii*, and as such it was described by IRVING in the *Gardeners' Chronicle*, 1911. ENGLER now calls it *S. × Irvingiana*—an unfortunate selection of a name, having regard to the existence of *S. × Irvingii* (a very different plant); and to add to the confusion KELLERER in 1915 names two new hybrids *S. × Sündermannii* and *S. × Pseudo-Sündermannii*. IRVING's earlier use of this name should certainly have precedence, and personally I shall continue to retain the name of *S. × Sündermannii* for this form.

*S. Burseriana × sancta* gives us *S. × Elizabethae* (fig. 27)—a fine form with humped green cushions and an abundance of yellow flowers, but they are not very large and their stems are inclined to flop. It also gives us the false *S. × 'Cherrytrees'* already described. From *S. Burseriana* var. *minor × sancta* we get *S. × ochroleuca*, a small plant of little interest, and from either *S. Burseriana* var. *speciosa* or *S. × Elizabethae × sancta* we get *S. × Godseffiana*, an intermediate free-flowering form of some merit.

Two yellow-flowered hybrids of SÜNDERMANN'S (*aretoides × Burseriana*) *S. × aretiastrum* and *S. × luteola* are said to be yellow Burserianas in appearance.

*S. × Paulinae* (*Ferdinandi-Coburgii × Burseriana* var. *minor*) is an exceptionally fine form—tight domed glaucous cushions and comparatively large pale yellow flowers of good shape. An almost identical form of looser growth ENGLER and SÜNDERMANN distinguish as *S. × Pseudo-Paulinae*, and ascribe the difference in habit to the substitution of *S. Burseriana* var. *major* for var. *minor*, but one has to be careful about many of SÜNDERMANN'S hybrids. We owe him a debt of gratitude for introducing some fine forms, but the many new names that appear in his catalogue each season often cover plants differing too slightly to warrant distinction, and from personal experience I am convinced that his new pedigree forms are often merely seedling variations. I received four forms of *S. × Borisii* from him as the same plant and Glasnevin received a white seedling for the yellow *S. × Kyrillii*, all of which I have little doubt would have received new "names" had they but flowered in the nursery before they were sent out.

*S. × bursiculata* (*Burseriana × apiculata*) is a fine white-flowered hybrid with exceptionally large glaucous foliage. I believe we owe its introduction to Mr. E. H. JENKINS.

Some of the red-flowered forms acquired by crossing *S. Burseriana* with members of the Engleria section are particularly attractive. The two Kew plants *S. × Irvingii* and *S. × kewensis* (*Burseriana* var. *major × porophylla*) are both good, and the former is hardy and easy to grow. Then there are SÜNDERMANN'S *S. × Sündermannii* and *S. × Pseudo-Sündermannii* from *S. Burseriana × Stribnyi*, the first being closer to *S. Stribnyi*; *S. × Marie Theresa* (*Burseriana major × Grisebachii*) and *S. × Hofmannii* (*Burseriana × thessalica*) are fairly intermediate between their parents, but so far the most useful plant of this section that I have met is *S. × Kellereri* (*Bur-*



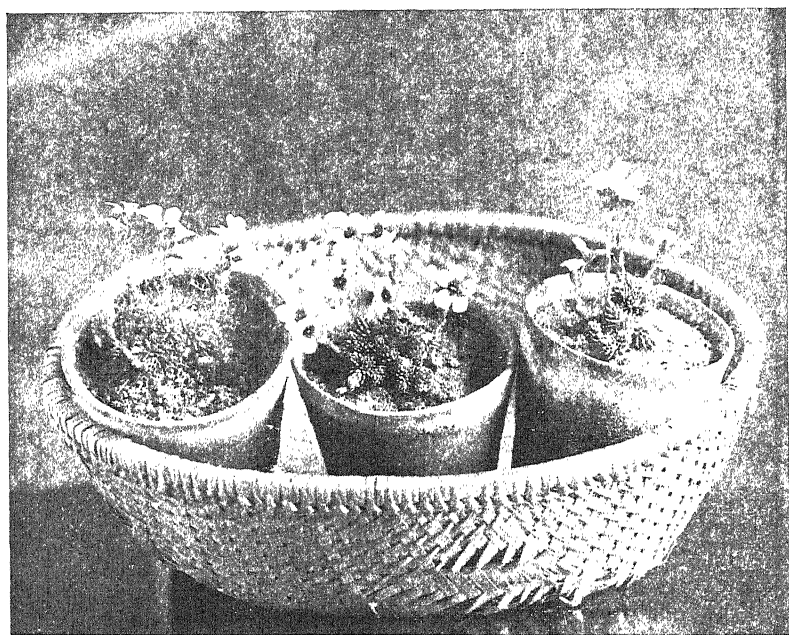


FIG. 24.—SAXIFRAGA × 'CHERRYTREES.'

[To face p. 52.]

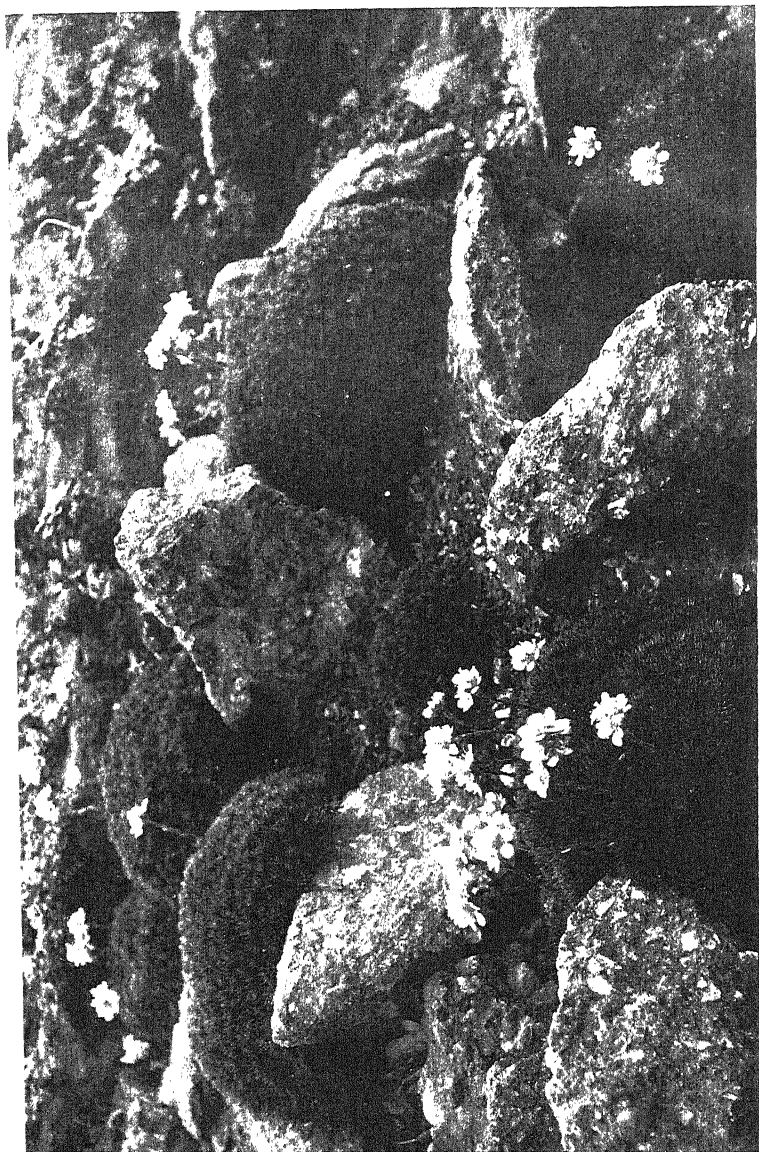


FIG. 25.—*SAXIFRAGA* × 'CHERRYTREES' OF THE TRADE.

*seriana*  $\times$  *Stribrnyi*). This was raised by Herr KELLERER in the Royal Gardens at Sofia. It grows very freely, throwing up silvery rosettes, larger than those of *S. Burseriana*, and good-sized lilac-pink flowers, and, best of all, it seems to have inherited the flowering period of both parents; it is one of the earliest to flower, and again, later on, it usually gives one a second display which, if not quite so fine as its first, is none the less very welcome.

After *S. Burseriana* possibly the most prolific parent in the Kabschia section is *S. marginata*. From it and *S. sancta* we get the indestructible *S. \times apiculata*, equally useful in its yellow or white forms.

*S. marginata*  $\times$  *tombeanensis* produced the true *S. \times Petraschii*, with particularly fine white flowers. *S. \times Leyboldii* (*marginata*  $\times$  *Vandellii*) is like a finer *S. Vandellii*.

*S. \times pungens* (*marginata*  $\times$  *pseudo-sancta*) has very dark green cushions and many rather dull yellow flowers. *S. \times Pseudo-Kotschyi* (*marginata*  $\times$  *Kotschyi*), with thin petalled star-like pale yellow flowers, usually masquerades as *S. Kotschyi*.

*S. \times Edithae* (*marginata*  $\times$  *Stribrnyi*) has the habit of the first parent and pink flowers. *S. \times Pseudo-Edithae* is a smaller version. *S. \times Hörhammeri* (*marginata*  $\times$  *Grisebachii*) I have not seen.

*S. aretioides* and *S. media* seem to cross themselves almost as freely in the Pyrenees as the mossy Saxifrages do in one's garden, and, as a result, we have the almost unending succession of slightly varying forms which SÜNDERMANN and ENGLER distinguish by separate names. With me none of them was very long lived, and I never troubled to replace any of them except *S. \times ambigua* and *S. \times luteo-purpurea*; but if anyone has the ambition to try the series he will find them under the following names: *S.S. \times Benthamii*, *aurantiaca*, *flavescens*, *parviflora*, *grandiflora*, *luteo-purpurea*, *erubescens*, *Lapeyrousei*, *ambigua racemiflora*, *Grenieri* and *Godroniana*.

*S. \times luteo-purpurea*  $\times$  *Stribrnyi* gives us a most attractive form in *S. \times Stuartii* (fig. 32)—a hearty grower bearing abundance of fair sized flowers orange-pink in colour.

*S. \times Heinrichii* (*aretioides*  $\times$  *Stribrnyi*), said to be intermediate between its parents, I have not seen. *S. \times Steinii* (*aretioides*  $\times$  *tombeanensis*) is near to *S. tombeanensis*, with cream-coloured flowers.

*S. Ferdinandi-Coburgii* has produced some useful forms, and I give a high mark to *S. \times Haagii* (*Ferdinandi-Coburgii*  $\times$  *sancta*). Its flowers, which are so freely borne, are of a particularly good deep yellow but are not large. The same parents produced *S. \times eudoxiana*, which is nearer to *S. sancta* and therefore proportionately less interesting.

From the Royal Gardens at Sofia KELLERER also sent out two outstanding forms in *S. \times Borisii* (fig. 28) and *S. \times Kyrillii*. The former, in its better forms, is one of the most attractive of the yellow-flowered hybrids. The finest form of it that I received has deep yellow flowers, very thick petalled, round-edged and practically overlapping, borne on stiff crimson stems. *S. \times Kyrillii* is paler, its flowers more star-

like and inclined to droop. But SÜNDERMANN must have raised seedlings of these two freely when he first got the plants from KELLERER, for, as I said before, I received four forms of *S. × Borisii* (and have seen more), and Glasnevin got a white hybrid as *S. × Kyrillii*; but not content with leaving KELLERER'S plants alone ENGLER ascribes to SÜNDERMANN two sub-varieties of these, which he names *S. × Pseudo-Borisii* and *S. × Pseudo-Kyrillii*, and ascribes to them a minutely different pedigree, stating that they were raised not from *Ferdinandi-Coburgii × marginata* (type) but from *Ferdinandi-Coburgii* and *S. marginata* vars. *Rocheliana* and *coriophylla*! To me they are nothing more than such slight variations as one would expect to get from sowing the seed of *S. × Borisii* and *S. × Kyrillii*.

*S. × Pseudo-Kyrillii* is very close to, if not identical with, a *S. × Rocheliana lutea*, sent out by SÜNDERMANN about 1916. But *S. × Bilekii* (*Ferdinandi-Coburgii × tombeanensis*) is a fine thing—tight silver cushions and soft yellow flowers.

*S. × Fontanae* (*Ferdinandi-Coburgii × diapensioides*)—said to be like a yellow-flowered form of the latter—I have not seen. *S. × Boeckleri* (*Ferdinandi-Coburgii × Stribrnyi*) is fairly intermediate.

We are just beginning to get results from *S. lilacina* blood. The earliest hybrid is the beautiful *S. × Myra*, raised by poor REGINALD FARRER. He wrote to me about it soon after it flowered, but unfortunately I have lost that letter. However, as far as my recollection goes, its parentage was *S. scardica* (Griesb.)  $\times$  *S. lilacina*, the *S. scardica* being the true species, and not the plant known as *S. scardica obtusa*. It is a beautiful thing, with large deep red flowers. *S. × Arco Valleya* looks like a *S. tombeanensis* with the flowers of a pink *S. × 'Faldonside.'* I do not know its parentage. Then we have Messrs. MAURICE PRICHARD'S new hybrids. *S. × 'Lady Beatrix Stanley'* at first sight seems akin to *S. × Myra*, but its parentage is given as *Godroniana × lilacina*; it is a fine form with large pink flowers. The same cross produced *S. × 'Aubrey Prichard,'* a smaller plant, and *Godroniana × Irvingi* is the parentage of *S. × Adela*.

Of the Kabschia section there remain to be noted three natural hybrids of great interest. The first, *S. × tirolensis* (*caesia × squarrosa*) (fig. 29), which occurs quite freely, is the connecting link between the two species. I found it much easier to keep than either of its parents and grew it on a limestone "moraine," where its tight minute cushions and white flowers on fairy-like stems were a perennial pleasure.

The other two are of botanical interest, *S. caesia* having allied itself with the moisture-loving *S. aizoides* producing *S. × patens*, and with the yellow biennial *S. mutata* it produced *S. × Forsteri*. Unfortunately both of these are what FARRER termed "miffy" plants in cultivation. However, Mr. CLARENCE ELLIOTT has raised a form of *S. × patens* with deeper flowers and a far better constitution, so it is probable that it will soon find its way into general cultivation.

The hybrids between the Kabschia and Engleria sections have already been dealt with, but there remain some pretty forms which

have been raised among the Englerias themselves. These again are mostly results from SÜNDERMANN's hybridization, and they are too numerous and some of them too indistinct to merit separate names.

*S. × Bertolonii* (*porophylla* × *thessalica*) is a not very attractive form—nearer to *S. thessalica* but larger and stronger growing, with dull dark crimson flowers.

*S. × Schottii* (*luteo-viridis* × *Stribnyi*) has flowers of an unusual orange-red. *S. × Gusmusii* (*thessalica* × *luteo-viridis*) has almost white foliage and flowers brighter than *S. × Bertolonii*. *S. × Dorfleri* (*Grisebachii* × *Stribnyi*) is like a smaller *Grisebachii*, while *S. × Fleischeri* (*Grisebachii* × *luteo-viridis*) has flowers of the same unusual tone as those of *S. × Schottii*.

*S. × Biasoletti* (*Grisebachii* × *thessalica*) is a good form, with smaller foliage and brighter flowers than *S. Bertolonii*.

*S. × Stanleyana* and *S. × Medici* of the trade are indistinguishable from *S. thessalica*, and *S. × Boisseri* is a twin to *S. × luteo-purpurea*.

Finally in this group PAX has recorded a weird natural hybrid between *S. luteo-viridis* and *S. Aizoon* called *S. × Paxii*, which I have not seen.

With the Kabschia and Engleria sections I have dealt fairly exhaustively. They are possibly the most interesting species in the genus, and one has not been overwhelmed with their natural hybrids; but with the Aizoons it is quite a different story. The silver Saxifrages are themselves mostly only geographical forms of the same type, and they cross themselves with the utmost freedom whenever they get the chance. So to get their hybrids one has only to sow seed collected in one's own garden to obtain forms equal to, if not surpassing, many named varieties. Consequently, the Aizoon hybrids can only be skimmed.

From the *cochlearis* group we get *S. × Burnatii* (*Aizoon* × *cochlearis*) with rounded rosettes and beautiful pure white flowers and *S. × 'Esther'* (*cochlearis* × *Aizoon lutea*) with plume-like sprays of pale yellow flowers. Another *cochlearis* hybrid is grown at Wisley as *S. × 'Snowdrift'*—in this case the rosettes are very silvery and the flower sprays of purest white.

From *S. Cotyledon* there are endless beautiful forms; the best occur when it crosses itself with *S. lingulata*. This cross is the supposed parentage of *S. × Macnabiana* (fig. 30), though one would rather suspect *S. Aizoon balcana* to have been one parent. At any rate at its best it is a notable form, with long arching sprays of white flowers so heavily spotted with crimson that the spots coalesce into a blotch. I once had an exceptional form, in which the bright crimson splotch practically covered the whole petal, leaving only a narrow white margin. It was illustrated, I think, in "Irish Gardening," but unfortunately it perished soon afterwards. *S. × launcestonensis* is another good form.

*S. Kolenatiana* is one of the few pink-flowered Aizoons. It gives

us the beautiful *S. × Sendtneri*, with long narrow-leaved rosettes and delicious soft pink flowers. Unfortunately it is a bad perennial, but I crossed it some years ago with *S. cartilaginea*, a rare Caucasian species of indestructible hardiness whose flowers vary from white to pink, but a pink so fleeting that it fades almost as the flowers expand.

My hybrid (*Sendtneri* × *cartilaginea*), which I showed in Dublin as *S. × knaptonensis*, has the habit of *S. cartilaginea* and the pure pink flowers of *S. × Sendtneri*, but it is rather a shy bloomer. But I have another hybrid—*Kolenatiana* × *Aizoon rosea*—which I think will be better.

*S. longifolia* should give us wonderful results, but somehow the resulting seedlings almost invariably lean towards the second parent. However, Mr. WALPOLE at Mt. Usher has a *S. longifolia* 'Mt. Usher Variety' which has some other *Aizoon* blood in it, but makes what appears to be typical *S. longifolia* in a bunch of rosettes instead of a single one.

*S. longifolia* × *cochlearis* gives the exquisite *S. ×* 'Dr. Ramsay,' and I should suspect a similar cross in *S. ×* 'Cecil Davies.'

Of the *S. lingulata* and *S. lantoscana* hybrids one of the very best is *S. × lingulata Alberti*, which I was told originated in Mr. BEAMISH's garden at Queenstown, but I am not certain. It is anyhow a magnificent plant, with its stout foliage and long sprays of large white flowers.

*S. × calabrica* (*lantoscana* × *longifolia*?) has wonderful silvery white rosettes, but its flowers, although pure white, are not as full as one would expect from its supposed parentage. *S. × paradoxa* (*lingulata* × *crustata*) is distinct by reason of its short and extremely narrow foliage, but its flowers are poor in size and of a dirty creamy green. But I got a really first-class hybrid from it (*paradoxa* × *longifolia*), which I gave to Glasnevin, where, with its profusion of tall white sprays, it is still one of the most admired forms on the rock garden.

Not content with hybridizing among themselves, the silver Saxifrages are quite content to cross freely with other species—an *Aizoon-Engleria* hybrid has already been mentioned. Another interesting group has arisen from *Aizoon* × *umbrosa* and *Geum*. The best-known are two forms named *S. × Andrewsii* (fig. 31) and *S. × Guthrieana*. These two forms are usually stated to be identical. *S. × Andrewsii* is said to be a garden "escape" found near Killarney, and its parentage is thought to be *Geum* × *Aizoon*. A sub-variety of this called *S. × acanthifolia* is supposed to be the reverse cross, but any plants I have received under this name so far have been normal *S. × Andrewsii*. *S. × Guthrieana* on the other hand is said to have been found wild on the Pyrenees—I have also heard that it originated in the garden of a Mr. STANSFIELD—but, whatever its origin may be, on comparison with *S. × Andrewsii* it appears to be distinct. The foliage of *S. × Andrewsii* is fairly wide and narrowly spoon-shaped; it shows faint lime "pit marks" along the margins of the leaves, which tend

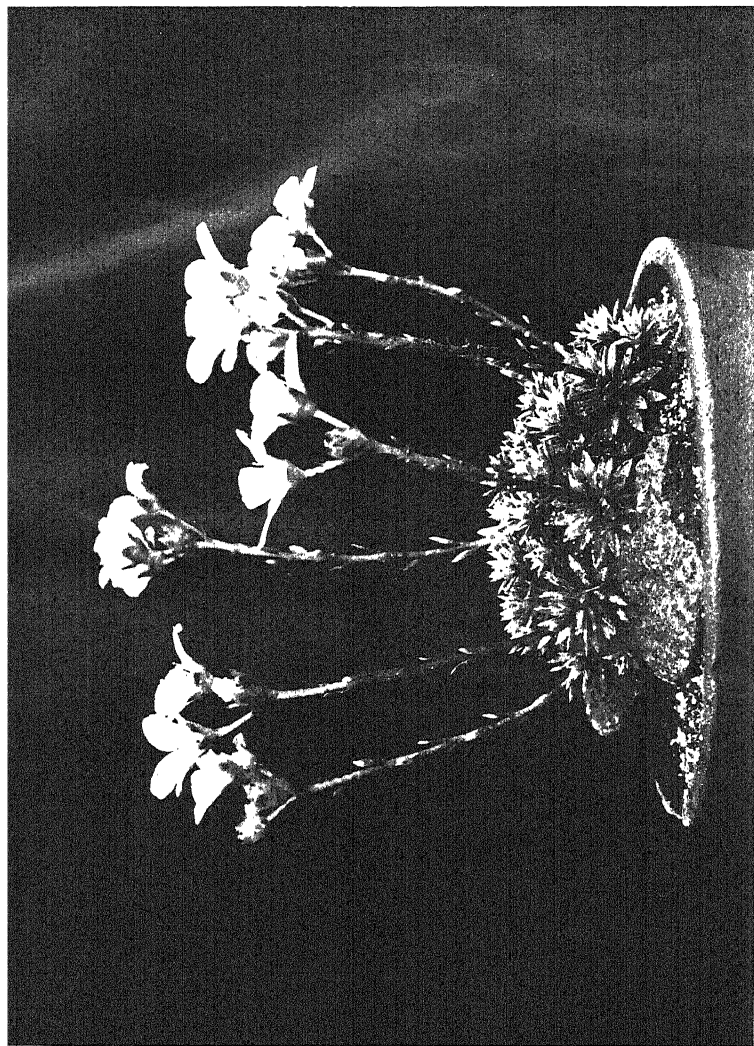


FIG. 26.—SAXIFRAGA  $\times$  SALOMONII, BOYD'S VAR.

[To face p. 56.



FIG. 27.—SAXIFRAGA  $\times$  ELIZABETHAE.





FIG. 28—SAXIFRAGA × BORISII.



FIG. 29.—*SAXIFRAGA* × *TIROLENSIS* AT KNAPTON.

[To face p. 57.

to become red in winter. The foliage of *S. × Guthrieana* is much narrower and rather pointed and its colour a uniform yellow-green. Both have flowers spotted with pink, those of *S. × Andrewsii* being purer in tone. There is a beautiful variegated or tricoloured form of *S. × Guthrieana* which is a very difficult plant to keep outside a frame or alpine house.

I found growing at Wisley yet a third form of obviously *Aizoon × Robinsoniana* blood. It is grown there as *S. × Guthrieana*, but is quite distinct from that variety, and in fact I would suggest that its parentage is *S. umbrosa × Aizoon*. Its leaves are short and very broad and round at the tips, deep green in shade, turning crimson in sun in winter; the rosettes are flat and very round and overlapping, and its flowers, borne on stiff stems, are pure white and unspotted. It is a much finer form than the other two, and I cannot trace its origin. I distinguish it by the name of *S. × wisleyensis*.

Other crosses between these sections are *S. × Pseudo-Forsteri* and *S. × Zimmereri* (fig. 33). The former is a dull little plant, supposed to be a cross of *S. cuneifolia* and *S. crustata*, with slightly spotted flowers, and the latter (*Aizoon × cuneifolia*) is a pretty form with tiny very round rosettes. *S. × Wildeana* (*Aizoon × Geum hirsuta*) I have never seen.

Some years ago I experimented with these two sections and raised some interesting forms: *S. Hostii × umbrosa*, *S. Hostii × cuneifolia*, *S. umbrosa × cochlearis*, *S. lingulata × cuneifolia*, *S. Aizoon baldensis × Geum minor*, and *S. Aizoon rosea × primuloides*. Of these the last was the prettiest, making a plant with tiny rosettes like *S. × Zimmereri*, with a profusion of deep pink flowers. I sent specimens of most of these to Edinburgh and Glasnevin, where I hope that some of them still exist, as I lost my entire stock during a prolonged absence abroad.

Some of the smaller sections give us a few uncommon hybrids. In the Miscopetalum group *S. rotundifolia × S. Geum* (Robinsonia group) gave us a very odd plant *S. × hybrida*, which I have never seen, unless it be identical with a plant I received years ago from GUSMUS, which was alleged to be of that parentage and was called *S. × Gurtleri*. This had small, almost stemless, leaves near to *S. Geum*, and flowers near to *S. rotundifolia*.

*S. taygetea × cuneifolia* produces *S. × tazetta*, which has rosettes not unlike those of *S. cuneifolia infundibuliformis*, with flowers near to *S. taygetea*. This form is not uncommon in cultivation, but is usually found under the name of *S. taygetea*.

Another curious hybrid I raised was *S. Geum minor* crossed by the N. American *S. reflexa*. It produced a weird little plant with small, rather concave, oval-oblong leaves, dark green serrated edges, and covered with bristly hairs; it never flowered.

The hybrid mossy Saxifrages would require a volume to themselves; in fact, the real difficulty in dealing with the mossy species is to get them true at all, as they cross themselves whenever they get

the chance. Named forms in endless variety appear in every nursery catalogue, most of which have gone through such a process of cross-breeding that their pedigrees would prove almost as complicated as that of a thoroughbred horse. One can therefore only mention a few.

First place must be given to *S. × Wallacei*. Its parentage is in doubt, ENGLER, following the Botanical Society of Edinburgh, giving it as *Maweania × Camposii*. For FARRER's reasons for doubting this see "The English Rock Garden," p. 325. He suggests *S. trifurcata* as one parent; and it certainly does not seem to be very near *S. Camposii* if (and it is a large "if") the plants of that species that one gets from Spain are true. But, whatever be its parentage, it stands out as one of the best of the mosses, with its fine foliage and masses of large pure white flowers.

*S. trifida × S. oranensis* is another fine form, and *S. × Lindsayana* (fig. 34)—which I believe originated in Edinburgh—makes a very fine effect, simply smothering itself with blossom.

A new break was made with the discovery of *S. decipiens × granulata*. The original hybrid, which I received from AHRENDs under the name of *S. × decipulata*, was a bold-looking plant with masses of very large white flowers on tall stems, but one rather regrets its advent, as since its introduction the *granulata* blood is being too freely used in many of the newer red-flowered hybrids, imparting to them extra size and additional coarseness, and seeing these bloated forms one longs for the daintiness of some of the earlier hybrids. The old *S. × 'Guildford seedling'* is still very hard to beat! *S. × 'Red Admiral'* was also a charming form, and I got quite a pretty form by crossing the grey woolly-leaved variety of *S. decipiens* that is found on Clare Island with *S. × bathoniensis*.

*S. × Farreri (hypnoides × tridactylites)* is a quaint minute form with very tiny rosettes.

Considerations of space have caused me to pass by several of the smaller sections which have given us hybrids. This article could under no circumstances deal with them all, but those I have omitted contain, in many cases, species so little known to cultivation that their natural hybrids are of less general interest than are those of the well-known *Kabschia* and *Aizoon Saxifrages*.

I am greatly indebted to the Keeper of the Royal Botanic Garden at Edinburgh for the series of beautiful photographs which illustrate this article, and to Messrs. STORMONTH & SONS for the illustrations of *S. × 'Cherrytrees.'*

## ORCHID GROWING.

By W. H. HATCHER, F.R.H.S.

THERE is no doubt that the cultivation of Orchids is a very fascinating hobby for the amateur who is fond of growing plants under glass. At flower shows when Orchids are exhibited one often hears this remark, "They are very beautiful, but we cannot grow them as they require special houses and a great heat." I should like to assure any amateur who is interested in growing or would like to grow Orchids that it is not necessary to have a special house, and that they do not require great heat.

In my opinion, after many years' experience, too much fire heat is one of the greatest errors that can be made in the cultivation of Orchids, as it not only adds to the cost, but is detrimental to the well-being of the plants.

To grow successfully some of the species, the aid of fire heat is *necessary*, but the idea of great fire heat can safely be dismissed. Orchids can be grown in any greenhouse if the amateur will study cultural details, which I will endeavour to give.

For the guidance of the amateur who has had little or no experience, I will divide them into two sections, Cool and Intermediate. This will embrace a large number of hybrids and species, and with careful selection would give something in flower for the greater part of the year, especially late autumn and early spring.

## COOL-HOUSE ORCHIDS.

Odontoglossums and Odontiodas are the principal subjects for the cool house. They are easily grown, and during the summer months require no fire heat. They are very useful to the amateur who is fond of a buttonhole, and the lasting qualities of the flowers are remarkable. During the past few years the skill of the hybridist has been so great with the Odontoglossums and Odontiodas that the amateur can now obtain varieties from pure white, rose, and purple, to the beautiful scarlet Odontiodas, and there is no doubt that the constitution of the hybrids is much better than that of the species, and they also grow more freely.

Although the species may not grow quite so freely many of them are very interesting and beautiful and are well worth growing. Such species as *Odontoglossum crispum*, *O. Pescatorei*, *O. Harryanum*, *O. triumphans*, *O. Rossi majus*, etc., should have a place in every amateur's collection.

Other subjects that may be grown in the cool house are Cymbidiums, a very useful and splendid lasting section. Flowers are

produced on long spikes. *Cymbidium Lowianum*, *C. Traceyanum*, and *C. Sanderæ* are perhaps the best of the species; but here again the hybrids that have been produced give a very large and varied selection for the amateur and are well worth growing.

Miltonias may be grown at the warmest end of the cool house. They form a very showy section, very useful for "staging" and decorative purposes.

Some of the varieties of *Cypripedium* grow very well at the warm end of the cool house. *Cypripedium insigne Sanderæ*, *C. insigne* 'Harefield Hall,' and the hybrids from *C. insigne* should be there; and *Lycastes*, *Masdevallias* and *Oncidiums* also thrive very well in this house.

#### TREATMENT FOR THE COOL HOUSE.

##### *Shading.*

Possibly one of the most common causes of failure with the amateur is in not shading the cool house in the early spring. *Odontoglossums* do not like the sun shining directly on them. If too much light is given early in the spring the back leaves are almost certain to fall. It is best to stipple the glass early in the spring, using the blinds when the sun gets stronger, as after our dull winter months the plants cannot stand the strong light. One is often tempted to let the sun shine on the plants after the dull days, but I have seen serious harm come to plants so treated.

##### *Potting.*

This may be safely done when the new growth is half made. Pot firmly; keep the plant below the rim of the pot. Early spring or late summer is the best time to pot *Odontoglossums*, using a compost of equal parts of *Osmunda* fibre and *Sphagnum* moss.

If a plant is correctly potted it may be lifted from the potting bench by its back leaves, without any fear of the plant leaving the pot. Above all things try to keep the fibre of the potting compost vertical. Avoid rolling the compost in placing it round the plant. In potting it has been observed that, if the potting compost is rolled in, the *Sphagnum* moss on the surface seldom grows and the surface becomes sour and hence difficult to water.

When repotting remove all dead roots and decayed compost. If the plant only requires a larger pot and the compost is good I advise picking out a little of the compost, as the plant is apt to become dry if new compost is placed around the existing ball only, for that is usually very solid. If the plant is in bad health through overflowing or any other cause it may be advisable to put it back into a smaller pot, adding a little more *Sphagnum* moss to the compost.

##### *Watering.*

Perhaps this is the most difficult part for the amateur in the cultivation of Orchids. If the plant is newly potted care must be

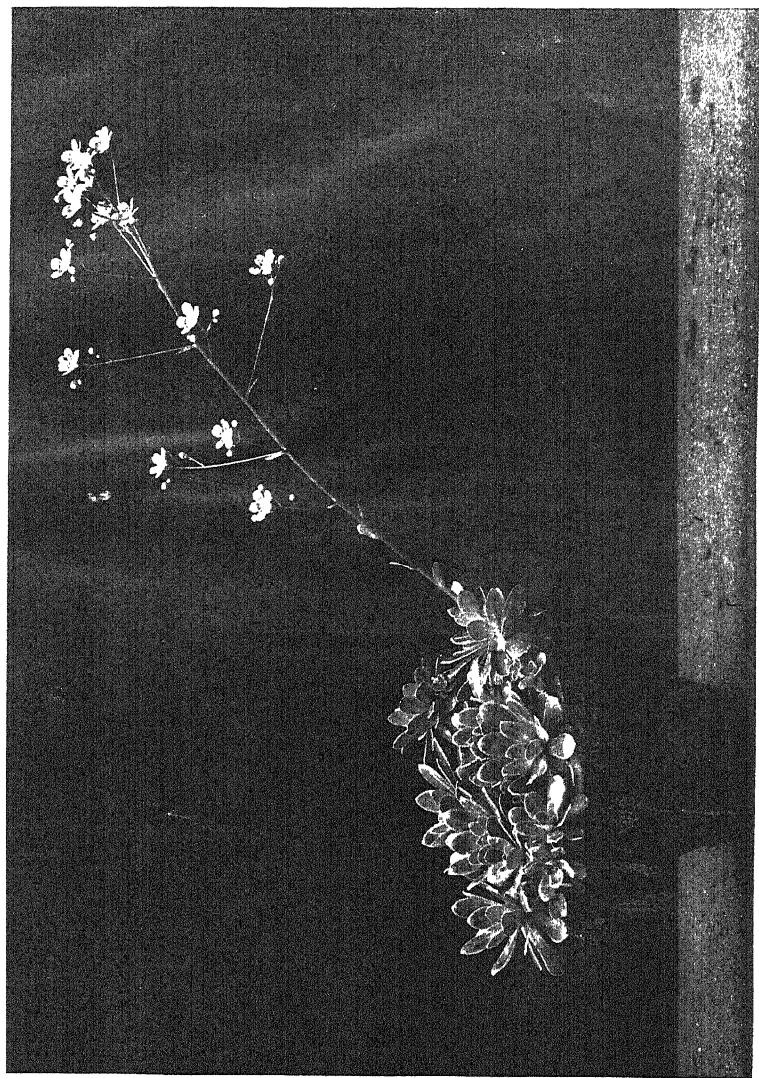


FIG. 30.—SAXIFRAGA × MACNABIANA.

[To face p. 60.

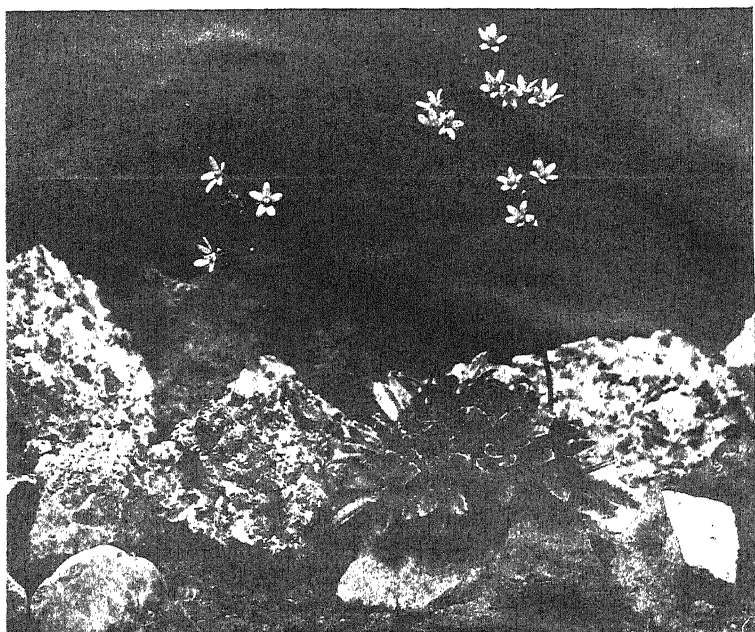


FIG. 31.—*SAXIFRAGA* × *ANDREWSII*

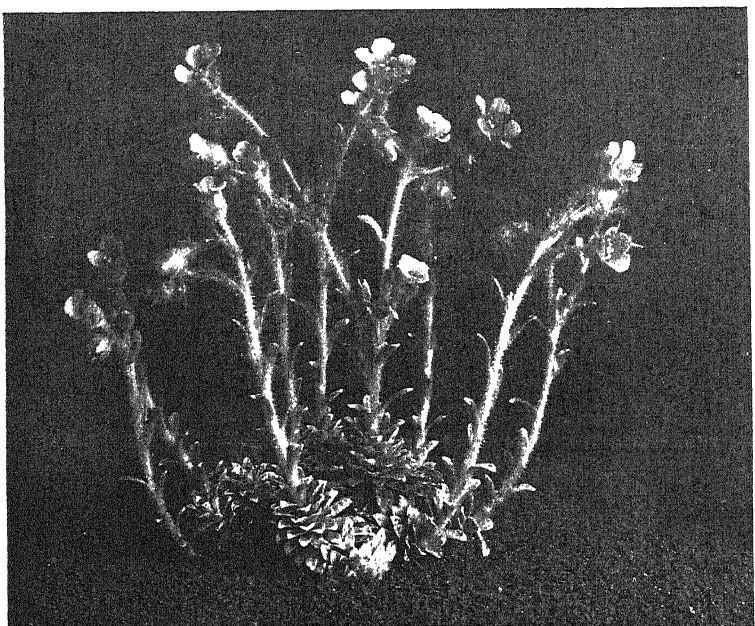


FIG. 32.—*SAXIFRAGA* × *STUARTII*.



taken not to give too much water until root growth has begun. When the plant is well rooted give a good watering and then leave for several days; a good deal depends on the weather conditions and fire heat how quickly the plant dries out. If the Sphagnum moss keeps green the plant does not require water.

### *Ventilation.*

Orchids do not like a stuffy atmosphere. If weather conditions are mild give top ventilation. Do not open the top and bottom ventilators at the same time, as this is likely to create a draught, which is detrimental to the plants.

If possible have open staging to stand the plants on. A second staging to hold moisture may be placed just over the hot-water pipes, but leave a space between walls and second staging to let the air circulate freely under the stage. I have seen many poorly grown *Odontoglossums* in houses where the staging was built into the wall, leaving no air space; this is often the greatest cause of failure in growing *Odontoglossums*.

### *Insect Pests.*

Thrips are the greatest enemies of the *Odontoglossum*; the damage is often done before one is aware of their presence. Spraying with an insecticide periodically is the safest means to keep the plants clean and healthy.

Fumigation is necessary if plants are badly affected with thrips, but as the plants themselves do not care for it this should be done only when necessary and not more than once a month.

### *Temperatures.*

In winter the night temperature should be 50° to 55° F., rising a few degrees during the day. In very severe weather, if the temperature fall below 50° F., keep the plants and houses drier.

## INTERMEDIATE HOUSE.

This house, owing to having the extra heat, gives the amateur an opportunity of making a more varied selection. Here can be grown *Cattleyas* and *Laeliocattleyas* and *Cypripediums*.

*Cypripediums* are no doubt great favourites, especially for winter flowering, owing to their lasting qualities and the great variety which it is possible to collect. Many amateurs when they first see *Cypripediums* do not admire them so much as some of the other species, probably taking the *Cypripedium insigne* as the standard they are familiar with; but it is now possible to obtain varieties that are beautiful in colour and of fine shape, from deep yellow to purple and white with beautiful spotting which enhances their beauty.

*Cypripediums* are fairly easily grown if shaded from the bright sunshine. They may be potted immediately after flowering. *Osmunda*

fibre, Sphagnum moss, a little loam and a few small crocks make a suitable compost. They are fairly moisture-loving plants and must at no time be allowed to get very dry at the roots. A slight spraying overhead in bright weather is very beneficial.

### *Cattleyas and Laeliocattleyas.*

To the amateur who is fond of colour and wishes for something decorative this section of Orchids will certainly give him great opportunities. The hybrids that have been raised between *Cattleyas* and *Laelias* and *Brassavola Digbyana* have made it possible by selection to have them in flower all the year round, although perhaps they are found the most useful in the spring and autumn months. The grand range of colour that it is now possible to obtain—pure white, yellow, mauve, and beautiful shades which are very difficult to describe—makes this section very much sought after. It is not a difficult group to cultivate if a few general points are kept in mind as to treatment. Perhaps no other Orchids suffer more from being potted at the wrong time than *Cattleyas* or *Laeliocattleyas*. In potting it is always safe to pot when the new roots are just pushing from the base of the last growth made. If potted at any other time there is a great risk of shrivelling of the bulbs, and the chances are it will have a struggle to live; in any case it is best to watch for the new roots.

After potting water should be given sparingly until the roots enter the new compost. Slight syringing overhead is usually sufficient for this purpose. During the summer months *Cattleyas* and *Laelias* benefit greatly if the house is closed during the afternoon, letting the temperature rise, damping the house thoroughly, and rolling the blinds up when safe from scalding with the sun. A little ventilation can be given towards the evening if outside conditions are favourable. For potting *Cattleyas* and *Laeliocattleyas*, use more *Osmunda* fibre and very little Sphagnum moss, and pot firmly.

### *Watering.*

When watering give a thorough soaking when plants are rooted, then leave to dry out again during hot weather. Spraying overhead is beneficial; when the new bulbs are made up give a little more air and water sparingly, just enough to keep the bulbs from shrivelling. Other Orchids suitable for the intermediate house, if grown at the cool end, are *Cymbidiums*, *Miltonias*, *Lycastes*, and a few of the *Oncidiums*. *Dendrobium nobile* and hybrids from it may be grown in this house. The temperature for the intermediate house during spring and summer months should be around 65° to 68°; in winter, 55° to 60°, according to the outside conditions prevailing.

For insect pests the same methods may be adopted as for the cool house. Scale insects are sometimes troublesome on the *Cattleyas* and *Laeliocattleyas*. They can be kept under if brushed over with methylated spirits.

Any amateur who may grow stove plants and has a very warm house could grow successfully *Dendrobiums*, *Phalaenopsis Schroederiana*, *Dendrobium formosum giganteum*, *D. Wardianum*, and a few other species of *Dendrobiums*, *Phalaenopsis Rimstadiana*, *P. Schilleriana*, *Oncidium Lanceanum*.

Having tried to give general ideas to the amateur, I would advise beginners to get into touch with a trade grower. These gentlemen are at all times willing to help the amateur in making a selection of the particular class of Orchids he wishes to grow.

I have seen many small amateur collections recently, and have been very much impressed with the number of different species of Orchids growing together and producing very satisfactory flowers. This convinces me that, if reasonable care and attention is given, amateurs in a small way can safely give Orchids a trial, and they will I am sure get a great amount of pleasure from them.

It is very important for the successful growing of Orchids that the potting should not be neglected. Unfortunately one often finds the Orchids more neglected regarding potting than any other plants grown under glass. This is the surest way to failure and disappointment.

## THE BRUNSDONNAS.

*(Brunsvigia × Amaryllis.)*

By A. WORSLEY.

THIS new genus of hybrid bulbous plants, possessing great longevity, good constitution, and capacity for sustaining existence over large areas in the temperate and warm-temperate zones, will remain for hundreds of years a valued inhabitant of gardens. It is therefore important to put on record all that is known of the origin and history of these crosses.

*Amaryllis Belladonna* has been cultivated in Britain for fully 214 years. The first attempt to cross *Brunsvigia* with *Amaryllis* was made just 100 years ago, and even to-day these hybrids are only just coming within the ken of the majority of plant-lovers.

My effort to trace back their history for the last 100 years has entailed much difficulty notwithstanding the records of various writers, each one of whom has added something to the general stock of information. Even now one may be sure that such information is by no means complete.

The generic name *Brunsdonna* was given by Messrs. Van Tubergen in 1909, so that I must not be accused of capriciously altering plant-names. My object is, rather, to standardize their nomenclature upon an accepted system.

The names of HERBERT, BIDWELL, Sir HENRY and Lady PARKER, and Mr. JOHN HOOG will always be associated with the great work of raising this new genus of plants. What care and perseverance this work entailed can be gauged from the fact that one must wait from sixteen to twenty-two years in our climate before one can see the results of one's work in the unrivalled beauty of the flowering. But it is repaid when that time comes.

*History of the Brunsdonna Hybrids.*

In the early days of hybridization it was the habit to give a name to an attempted cross when pollination was effected, and without waiting to see the seedlings reach the stage of flowering. The more prudent among these early hybridists would wait until the seedlings germinated, and then, if they noticed any variation from the foliage of the female parent, would name their new plant.

My own experience is that neither procedure is admissible. Some juvenile erraticism in foliage may lead the latter astray,\* whereas the former were little better than gamblers.

\* A very high percentage of seedlings of *Cupressus Lawsoniana* show marked juvenile erraticism, out of which they generally grow when they reach maturity. Many other plants show this trait.

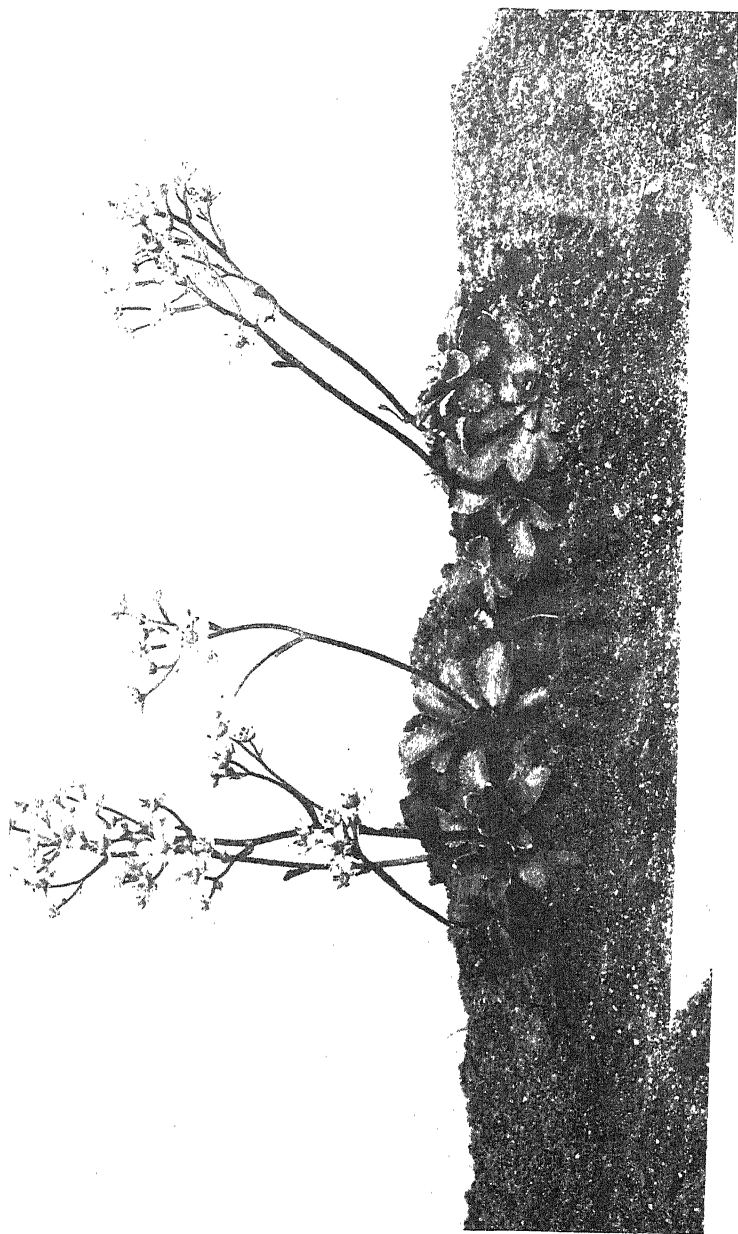


FIG. 33.—*SAXIFRAGA* × *ZIMMETERLI*.

[To face p. 64.

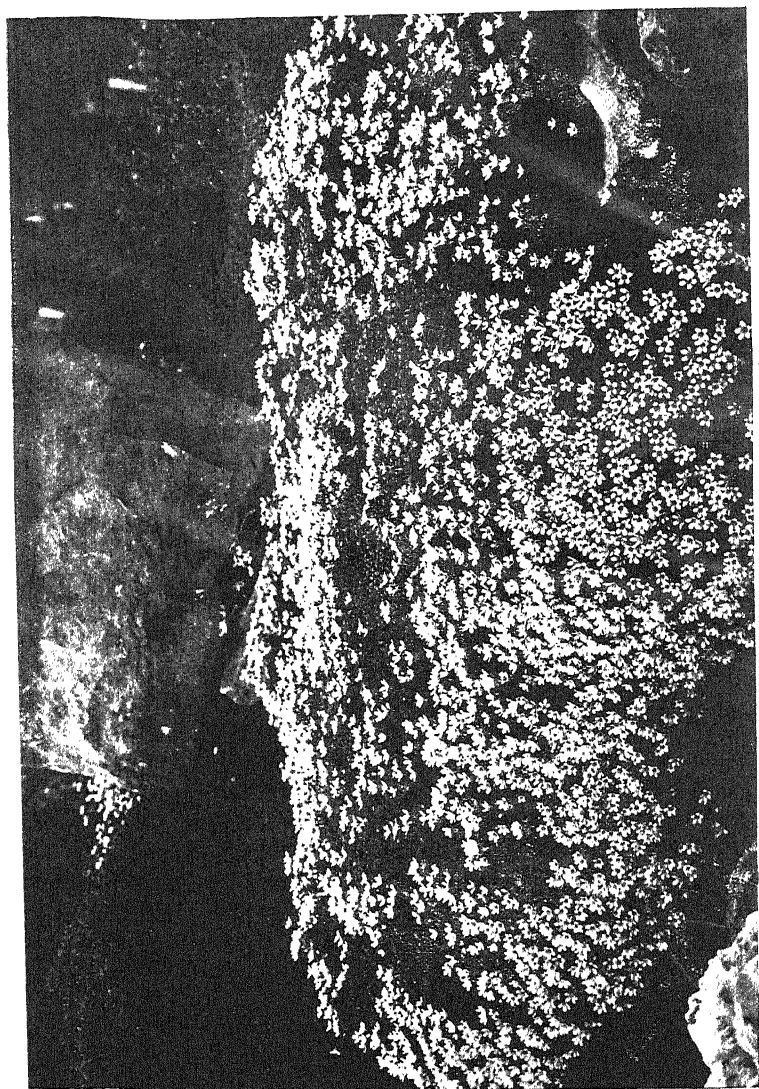


FIG. 34.—SAXIFRAGA × LINDSAYANA.

To which of these classes HERBERT belonged is not on record. It was about 1825-26 when he crossed *Brunsvigia Josephinae* with the pollen of *Amaryllis blanda* (now extinct in gardens). There is no record of these seedlings having flowered. The question of whether he named his hybrid in a sense that would carry conviction of priority to the International Convention on Nomenclature can only be decided by the Convention. In the letterpress of his "Amaryllidaceae" he gives no specific name to his cross, but twice in the index he names it "Spofforthiae."\* That his generic name was *Amaryllis* is not in doubt, because he places *B. Josephinae*, *B. grandiflora*, and *B. Banksiana* (*B. Slateriana*) under the genus *Amaryllis*.

But inasmuch as we have no evidence that he succeeded in his attempt to hybridize his parent plants, one cannot even suggest that the specific name "Spofforthiae" should be given priority. Probably HERBERT made the cross more than once, losing his seedlings raised on *Brunsvigia*, and saving those raised on *A. blanda*. In *Paxton's Magazine* is a figure of *A. blanda*, sent by Mrs. BELLENDEN KER from Cheshunt. It is true *A. blanda*, just like the figure in *Botanical Magazine*, t. 1450, and the bulb had been bought at Dean HERBERT's sale in a lot marked "Hybrid."

The next hybridization was made by J. C. BIDWELL, Superintendent of the Botanic Gardens at Sydney, N.S.W., where he died in 1853. He effected hybridization in 1841, raising crosses both ways, and also crossed *B. multiflora* with *Amaryllis Belladonna* both ways. He says†: "In February 1841 I raised a vast number of seedlings from *Belladonna* by *B. Josephinae* and by *B. multiflora*. Seedlings flowered in six years and are extremely beautiful. Their colour is generally like that of *Passiflora kermesina*, but it varies in different specimens, and many are blotched with white. There are from twenty to forty flowers on a scape. The shape varies greatly, the crosses by *B. multiflora* being generally wider in the segments than the others, and of a better figure, shorter and more ringent. The germen does not seem to contain any ovules, and the anthers are without pollen. Leaves varying in width from 1 inch to 4 inches, but always glaucous." And again: "In 1847 I saw a pot containing about 300 seeds of *B. multiflora* × *A. Belladonna*, but not more than thirty of them germinated. I believe the bulbs are still living (1850)." He adds that he could never keep alive the hybrids raised on *B. Josephinae*.

BIDWELL was therefore the first person who made this inter-generic hybrid and raised his hybrids to maturity, and, by rights, the cross should have been named *Brunsdonna* × *Bidwelli*. I am at a loss to understand how his good work came to be overlooked. But it is possible to make up for shortcomings by now naming his *Amaryllis Belladonna* × *Brunsvigia multiflora*, and which he also saw in flower, *Brunsdonna* × *Bidwelli*.

The third time that *B. Josephinae* and *Amaryllis* were crossed was

\* HERBERT, "Amaryllidaceae," pp. 278-9, 422, 425.

† *Gard. Chron.* July 29, 1850, p. 470.

in the garden of Sir HENRY and Lady PARKER, when Sir HENRY was Governor of N.S. Wales. It was in commemoration of this hybridization that the late Mr. W. WATSON, on February 6, 1909, obtained priority for the specific name of "*Parkeri*." \* A plant in flower was shown at the Royal Horticultural Society, from Sir H. W. PARKER's garden, August 18, 1875.

The fourth crossing of *B. Josephinae* with the pollen of *Amaryllis* was by Messrs. VAN TUBERGEN of Haarlem.† They published a figure but they failed at the time to give the hybrid a specific name.

I have also crossed these plants, but, like BIDWELL, found that seedlings raised on *B. Josephinae* were impossible to grow on to flowering size. Both *B. × Parkeri* and the var. *alba* are fertile in my garden.

### *Seedlings and recently-raised Varieties.*

#### BRUNSDONNA × PARKERI ALBA.

The almost endless variety known in florists' plants is the result of many inter-crossings and of the self-fertilization of desirable variants.

Species, or fixed types, in which all characters seem to be linked, will begin and continue to produce variants from the type if it is found possible to rear seeds on (or from) some chance abnormal flower that may appear. From that time the fixity of characters begins to break up, and it becomes a question of time before subsequent crossed generations exhibit a growing diversity of characters. (See JOURNAL R.H.S., May 1911.)

An account of *A. × Parkeri*‡ appeared in JOURNAL R.H.S., November 1909. By that time I had twice obtained fruit from it. It first flowered with me in August 1897. I raised fruit upon it in 1899, and again in 1904. Only two of the seedlings from these fruits have yet flowered, and both proved typical *B. × Parkeri*.

*B. × Parkeri alba* was raised by self-fertilizing a multi-petalled flower of *B. Parkeri* in 1904, and it flowered for the first time in September 1911, when it received an A.M. Two bulbs from this batch have proved to be *B. × Parkeri alba*, and two others were *B. × Parkeri*.

*B. × Parkeri alba* varies from *B. × Parkeri* in several respects besides colour. In a general sense it varies as *Crimum Powellii alba* varies from the original *C. Powellii*, the flowers being larger, shorter in the tube-shaped part of the limb, and more recurved.

The seeds producing *B. × Parkeri alba* were discernible from those of bulbs that have produced coloured flowers. On dehiscence of the fruits these seeds were colourless; the type, coloured pink.

We have now the following four hybrids and varieties between *Brunsvigia* and *Amaryllis*.

\* *Gard. Chron.* Feb. 6, 1909, p. 92.

† *Gard. Chron.* Jan. 23, 1209, p. 57.

‡ Prior to November 1925 all these hybrids (with the exception of Messrs. Van Tubergen's hybrid) went under the generic name "*Amaryllis*," under which all previous references will be found.



(1) *Brunsdonna*  $\times$  *Bidwelli* (probably to be found alive in some Australian gardens).

(2) *Brunsdonna*  $\times$  *Parkeri* (now widely spread in gardens). (*Garden*, November 19, 1898, fig., p. 57.)

(3) *Brunsdonna*  $\times$  *Parkeri* var. *Tubergeni* (in a few gardens). (*Gard. Chron.*, January 23, 1909, fig).

(4) *Brunsdonna*  $\times$  *Parkeri* *alba*. (*Gard. Illustrated*, October 3, 1925, with fig. Also *Gard. Chron.*, November 14, 1925, with figure.)

Other hybrids are alleged to have been raised, but opportunity for examination has not been accorded me. One received A.M. on September 12, 1911, under the name *Brunsdonna*  $\times$  *Sanderæ* *alba*, when shown by Messrs. Sander of St. Albans.

Four reputed hybrids are figured on one plate in the *Bulletin Soc. Toscano di Ort.*, 1895.

*Amaryllis blanda*, which HERBERT grew, but which has become extinct in gardens, may perhaps be a natural hybrid *Brunsdonna*. According to him it was collected by NIVEN long before HERBERT's time; for he says ("Amaryllidaceae," p. 277) that it "was found by NIVEN, who collected for Mr. HIBBERT, and I believe has never since been met with by any collector." On the other hand, there is a plate of it in *Botanical Magazine* (t. 1450), and in the letterpress it is stated to have been collected by Sir JOSEPH BANKS in the Cape of Good Hope (?), and to have been sent to MILLER in 1754 by VAN ROYËN from Holland.

The Curator of the Royal Botanic Gardens, Kew, has kindly given me certain records of the history of *B. x Parkeri*, as known to him. Bulbs were presented by Mrs. ARBUCKLE, of Stawell House, Richmond, in January 1889, and were entered as *A. Belladonna*  $\times$  *B. Josephinae*. Lady PARKER had lived at Stawell House prior to Mrs. ARBUCKLE.

My thanks are due to the Curator, and also to Mr. COUTTS, for kindly looking up a large number of records treating of this hybrid, and of which I thankfully avail myself in this article.

My thanks are also due to Mr. HUTCHINSON, librarian of the R.H.S., for researches made by him.

## POLLINATION OF THE PRIMROSE.

By B. BUXTON, F.L.S., F.R.H.S.

It has never been decided just how primroses are pollinated in nature. DARWIN sixty years ago considered that they were pollinated by night-flying moths, and MILLER CHRISTY \* (1922), as a result of his own observations and those of others, is inclined to accept this theory, although he does not altogether exclude occasional pollination during the daytime, either accidentally by small insects creeping over the flowers or normally by long-tongued bees. But in his opinion bees so seldom visit primrose flowers that it is improbable they can account for more than a fraction of the actual pollination.

On the other hand MARSDEN JONES † (1924) considers that enough long-tongued bees visit the primrose flowers during the daytime to account for all the pollination. MARSDEN JONES followed up his observations by screening primroses in the spring of 1925, and obtained results confirming his opinion that pollination is effected during the day.

Independently of MARSDEN JONES I have also (1925) tried screening on a small scale as follows.

An open wooden frame over which muslin is stretched covers two plants. This arrangement would not exclude ants and other small insects from creeping in from below, although probably only comparatively few would get in.

Six plants of yellow primroses were covered in this way day and night from March 15 to May 15. Six other plants were covered from 6 P.M. to 8 A.M., and six more covered from 8 A.M. to 6 P.M. Half of the plants in each case were short-styled and half long-styled.

Two plants were kept as controls under the same conditions of cultivation, but not covered.

At the end of the trial on May 15 the few flowers remaining still capable of pollination were picked off, and the flower stalks counted. On June 7 the numbers of capsules set were counted, and the percentage calculated.

	Flowers.	Capsules set.	Capsules per cent.	Per cent. of Totals.
1. Covered day and night, 2 short-styled	{ a 62 b 70	{ 0 0	{ 0 0	2
2. Covered day and night, 2 long-styled	{ a 31 b 37	{ 6 0	{ 19 0	
3. Covered day and night { 1 short-styled 1 long-styled	{ 64 15	{ 0 0	{ 0 0	
4. Covered 6 P.M. to 8 A.M., 2 short-styled	{ a 27 b 37	{ 12 29	{ 44 78	
5. Covered 6 P.M. to 8 A.M., 2 long-styled	{ a 33 b 60	{ 25 34	{ 76 57	66
6. Covered 6 P.M. to 8 A.M. { 1 short-styled 1 long-styled	{ 84 35	{ 52 30	{ 62 86	

\* *Jour. Linn. Soc.* Sept. 30, 1922.† *Proc. Linn. Soc.* Dec. 1925.

	Flowers.	Capsules set.	Capsules per cent.	Per cent. of Totals.
7. Covered 8 A.M. to 6 P.M., 2 short-styled	{ a 85 b 108	3 17	3.5 16	16
8. Covered 8 A.M. to 6 P.M., 2 long-styled	{ a 35 b 31	6 9	17 29	
9. Covered 8 A.M. to 6 P.M. { 1 short-styled 1 long-styled	40 74	10 15	25 20	58
10. Exposed day and night { 1 short-styled 1 long-styled	38 34	21 21	55 62	

It is apparent from the table that the plants (4, 5, 6) covered at night only, and those (10) not covered at all, become pollinated to about the same extent—in the neighbourhood of 60 per cent. ; while the plants (7, 8, 9) covered most of the day, and especially that part of the day most favourable for the visits of bees, etc., become pollinated to a much less extent, approximating 16 per cent.

The trial does not show that there has been no pollination at night, but it seems more probable that the 16 per cent. pollination of 7, 8, 9 has been effected in the early morning or evening and not at night. MARSDEN JONES, who covered his day-protected plants at about 5 A.M., found that scarcely any seed was set, and the difference between his results and mine was probably due to the difference between 5 A.M. and 8 A.M.

Of the six plants, three short- and three long-styled, covered night and day, only one, a long-styled plant, set any seeds. The six capsules set in this instance were on the lowest flower-stalks, trailing on the ground under the leaves, and it is probable that pollination took place accidentally, either by means of small insects crawling over the flowers or that the flowers selfed themselves on account of being clogged by dirt and moisture. However this may be, it seems that accidental pollination may sometimes occur, as suggested by MILLER CHRISTY, since it was not possible for large insects on the wing to reach these flowers.

MARSDEN JONES in his trials has never found plants covered night and day to set any seeds, and considers that selfing never occurs.

Incidentally, two plants, one long- and one short-styled, were treated in another way. They were surrounded by a closed wooden frame, over which a piece of wire netting,  $\frac{1}{2}$ -inch mesh, was laid.

This would prevent the plants being visited directly by large insects on the wing, though a bee or other long-tongued insect, by alighting on the wire, could easily crawl through, and there would be nothing to prevent smaller insects from visiting the flowers as readily as those in the open.

Of these two plants the short-styled had nineteen flowers, none set ; and the long-styled, forty-eight flowers, of which three set. It so happened that the latter sent up a polyanthus-like stem, so that the topmost flowers reached as high as the wire. The three which set seed were precisely those which reached to and protruded slightly beyond the level of the wire, and could be visited by a bee on the wing without first alighting. It seems probable that in this case pollination occurred normally, and was not accidental.

The results obtained coincide very closely with those of MARSDEN JONES, and both his experiments and mine tend to confirm his view that pollination takes place by day and not by night.

The single experiment with wire netting indicates that normal pollination is effected by long-tongued insects on the wing only, but further trials will have to be made along similar lines before any definite conclusions as to this point can be arrived at.

## THE ROYAL BOTANIC GARDEN, CALCUTTA.

By Lieut.-Col. A. T. GAGE.

UNLIKE the mediæval Physic Gardens, which were founded for the cultivation of simples, and later developed into Botanic Gardens, and unlike the Royal Botanic Gardens of Kew, which owe their origin to the interest in botany of royalty and of men of wealth and position, the Royal Botanic Garden of Calcutta, like most of the botanic gardens founded overseas in the later years of the eighteenth and early years of the nineteenth centuries, was established with a purely economic aim.

On June 1, 1786, Lieut.-Col. ROBERT KYD, of the Hon. East India Company's Bengal Engineers, and Secretary to the Military Department in Calcutta, wrote a long letter to the Public Department. Taking as his text the fact that a tree which he had introduced ten years before from the eastern frontier of Bengal to the collection of plants in the garden of the Governor-General resembled the true Cinnamon of Ceylon, then a Dutch possession, and that the true Cinnamon introduced to the same garden direct from Ceylon by Captain PRICE was flourishing, Colonel KYD pointed out that the East India Company could readily cultivate Cinnamon plantations within their own territories and so be independent of the Dutch.

He also urged that it required only a small degree of encouragement to the efforts made by private industry to enable the Company to outstrip their rivals in every valuable production, which if attended to could not fail to prove a further source of riches. He ended his letter by suggesting "the propriety of establishing a Botanical Garden, not for the purpose of collecting rare plants (although they also have their use) as things of mere curiosity or furnishing articles for the gratification of luxury, but for establishing a stock for disseminating such articles as may prove beneficial to the inhabitants, as well as to the natives of Great Britain, and which ultimately may tend to the extension of the national commerce and riches, and I conceive can be best effected by Government procuring from the different parts of India, and establishing a nursery stock, from which private individuals may be supplied gratis who may think themselves qualified to adventure on a general cultivation of the innumerable articles which our possessions will furnish the means of raising with success, of which I shall beg leave to suggest the enclosed very imperfect enumeration."

The "enumeration" comprised Dacca Cotton, Indigo, Cherah Root (*Oldenlandia umbellata* L.), Sarsaparilla, Ipecacuanha, Tobacco, Coffee, Sandalwood, Lac, Mugadooty, Gummatty (*Arenga saccharifera* Lab.), Teak, Poonwood (*Calophyllum*), Pepper, Cardamoms, Gum

Copal, Asafetida, Gum Myrrh, Gum Benjamin, Camphor, China Lacker (? *Melanorrhoea usitata* Wall.), Nutmeg and Clove, Tea, Green and Bohea.

Sir JOHN MACPHERSON, then officiating as Governor-General in the absence of WARREN HASTINGS, who had left for England the previous year, strongly supported the proposal, which was submitted to the Court of Directors in London for sanction. The Directors gave their "most hearty approbation to the Institution, as the charges thereof are estimated at not more than 200 rupees per month," for such was the modest scale of Colonel KYD's proposal. The Directors, however, expressed themselves as so sensible of the vast importance of the objects in view, that it was by no means their intention to restrict the Indian Government in point of expense. Before the sanction of the Directors reached Calcutta, the Government there had started the garden on "a proper spot of ground . . . in the vicinage of Calcutta." The proper spot of ground consisted of about 310 acres on the right or, as the river there flows, the north bank of the Hooghly, about four miles below Calcutta and on the opposite side of the river from the city. Succeeding generations have not always shared the opinion of the Government of 1787 as to the site chosen being a "proper spot," for it was very inconvenient of access from Calcutta until a few years ago, when the Port Commissioners' ferry steamers, that ply up and down the river, made the Garden a place of call. For many years also a considerable part of the Garden was little better than a swamp. Colonel KYD was appropriately appointed the first and honorary Superintendent, and as he had his country house and garden just to the east of the Botanic Garden this was a convenient and, for Government, an economical arrangement.

The site stretched along the Hooghly originally for well over a mile, the western half extending northwards for over half a mile to form a rhomboidal area, while its eastern half narrowed to an oblong area less than a quarter of a mile in breadth. Colonel KYD held charge of the Garden until his death in 1793. During his tenure over 300 species were introduced, amongst them being many of those mentioned in his "enumeration" already quoted. Attempts were also made to introduce such fruit trees as the Mangosteen, the Breadfruit, and the fruit-yielding species of Europe. Many of these were of course doomed to failure, but the results were none the less valuable for being negative. Timber trees, Indian and exotic, were cultivated on a considerable scale, and Teak received particular attention as specially suitable for shipbuilding. A Teak plantation was formed towards the eastern end of the Garden, where it remained for years after its failure was patent.

KYD was succeeded in the superintendentship—now become a paid post—by WILLIAM ROXBURGH, who continued in charge until 1813, when ill-health compelled him to leave India. There is no reason to refer here to ROXBURGH's botanical work, except to mention that in giving most of his attention to economic botany he conformed

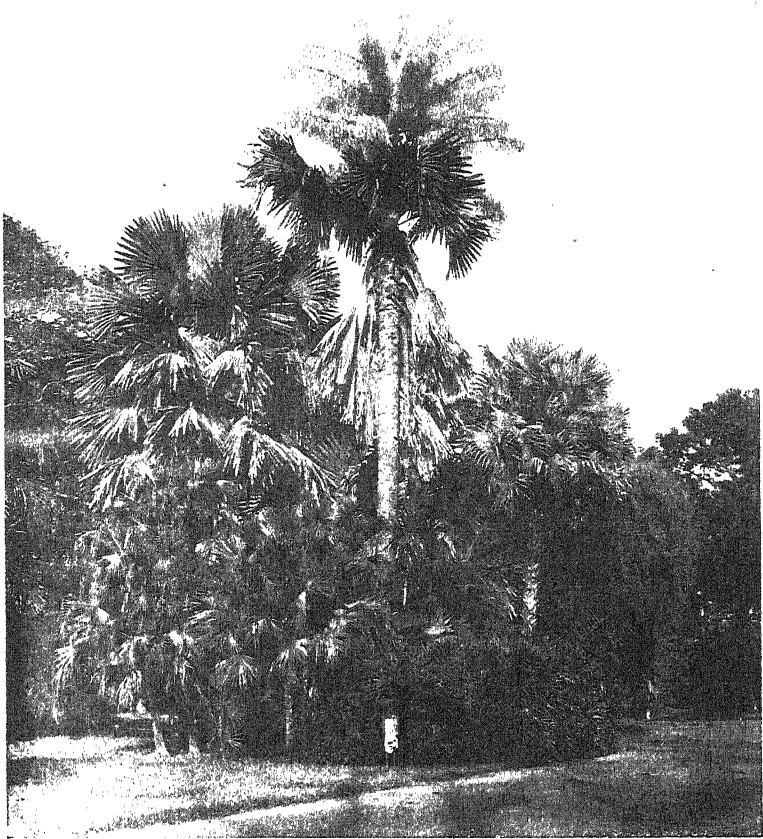


FIG. 35.—CALCUTTA BOTANIC GARDEN : IN THE PALMETUM.  
*Corypha umbraculifera* L. in flower, *Livistona chinensis* R. Br., *Rhapis flabelliformis*  
 L. Herit., *Phoenix sylvestris* Roxb.

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FIG. 36.—CALCUTTA BOTANIC GARDEN : PALMYRA AVENUE, LOOKING WEST.



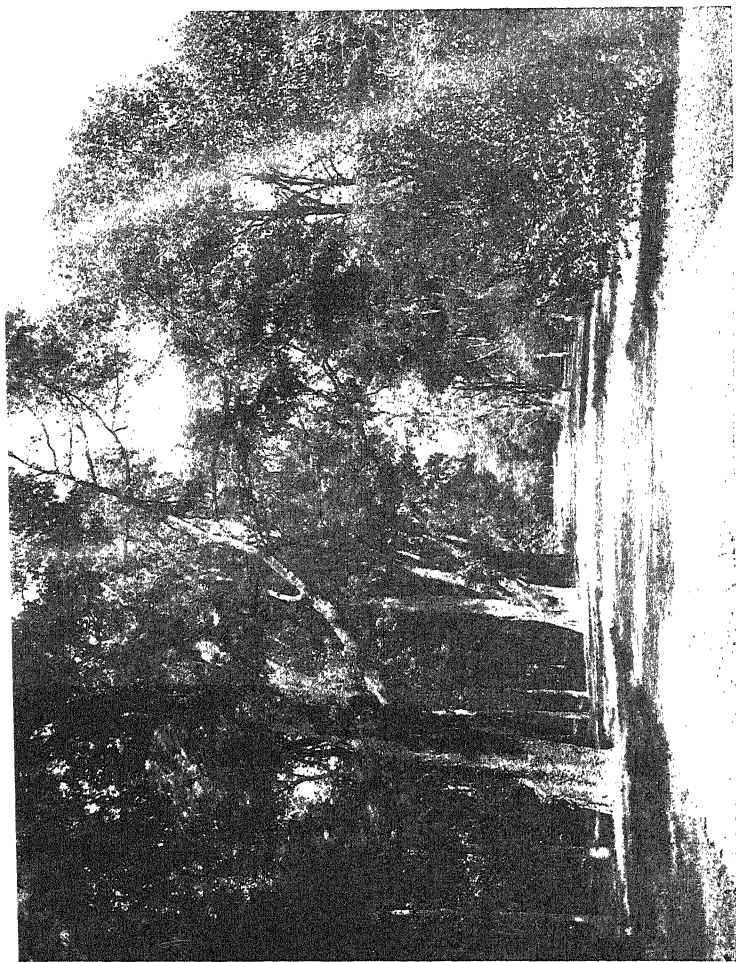


FIG. 37.—CALCUTTA BOTANIC GARDEN : ROXBURGH AVENUE.  
Old Mahogany trees. Part of large Banyan in distance.

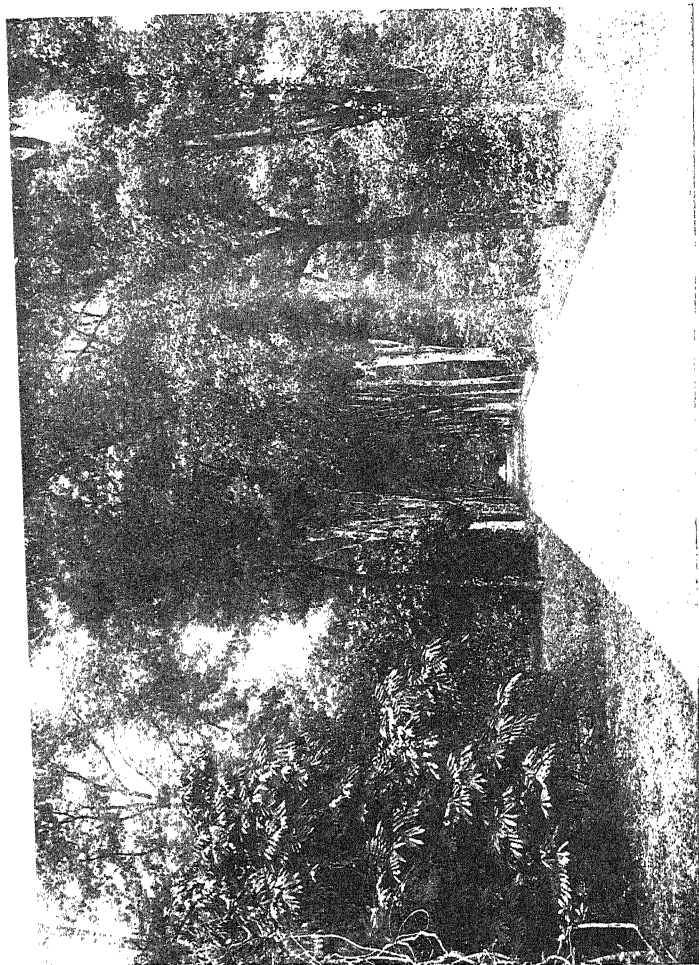


FIG. 38.—CALCUTTA BOTANIC GARDEN: THOMSON AVENUE, NORTHERN PART.  
*Albizia Richardiana* and *Amherstia nobilis*.

[To face p. 73.

with the purpose of Government in founding the Garden. As far as the Garden itself is concerned, he drew up the first catalogue of the plants occurring in it. This catalogue, the "Hortus Bengalensis," was published after ROXBURGH's departure by his friend Dr. CAREY, the celebrated missionary. The total number of Phanerogams mentioned as "growing in" the garden is about 3,240, belonging to 803 genera. More than half of the species were herbaceous, including the weeds and ornamental flowering annuals. In the list are some species which could not possibly have survived very long, such as *Crocus vernus*, *Plantago major*, *Conium maculatum*, *Rumex Acetosa*, *R. Acetosella*, *Stellaria dichotoma*, *Geum urbanum*, *Lamium amplexicaule*, *L. purpureum*, Wallflower, Cranesbill, Gorse, Laburnum, Clover, Dandelion, Poterium, Dog's Mercury, and other species of ROXBURGH's far-off Western home. There were 850 species of trees.

The earliest map of the Garden found by the writer is dated 1816 and shows only the broad western part, but probably little different from what it was in ROXBURGH's time. In 1816 the central part of the western half of the Garden was apparently still undeveloped, with no paths or roads, with branching water channels sprawling through it and probably more or less swampy. Surrounding this central area were a farm and orchard, four nurseries, a Linnæan garden, a kitchen garden, and five small garden divisions probably in course of planting up. There were only a few narrow roads.

Between 1813 and 1817 H. T. COLEBROOKE, FRANCIS HAMILTON, NATHANIEL WALLICH, JAMES HARE and THOMAS CASEY successively held charge of the Garden, until in the latter year the Court of Directors finally appointed WALLICH as Superintendent. He held office until 1846. During his term the Garden underwent vicissitudes of fortune. In 1820 between 30 and 40 acres were cut off from the eastern end, including the Teak plantation, to give ground whereon to build Bishops College, which since 1880 has been the Sibpur Engineering College. In 1836 the Agricultural and Horticultural Society of India, which had been founded by CAREY in 1820, was allotted about 2 acres in the north-west corner of the Garden for its experimental cultivation. The Society's allotment was repeatedly enlarged until in 1864 it extended to 25 acres.

From 1817 to 1830, when WALLICH was in his prime, the number of species in cultivation was doubled, and the Garden was celebrated as the most beautiful in the East and renowned throughout Europe as, in the words of HOOKER in his Himalayan journals, having "contributed more useful and ornamental tropical plants to the public and private gardens of the world than any other establishment before or since." This golden time did not last, and the Garden was destined to endure years of official neglect, difficulties, and disasters. In 1830, when WALLICH was in England, a Financial Commission was assembled during the Governor-Generalship of Lord WILLIAM BENTINCK to rectify the finances of India, that had been crippled by the expenditure on the first Burmese war under Lord AMHERST. One of the results of

this Commission was that the allowance for the Garden establishment was reduced to Rs. 1,100 per month, with Rs. 160 for contingencies. The same Commission also proposed that the salary of the Superintendent should be reduced to Rs. 500 per month when WALLICH should cease to hold office. With such an inadequate allowance and doubtful future, development of the Garden was impossible, and this condition is reflected in WALLICH's report for 1835-40, which is concerned almost entirely with distribution of plants and seeds. From 1842 to 1844 WALLICH was absent at the Cape, and for part of the time WILLIAM GRIFFITH officiated as Superintendent. In 1843 he submitted a comprehensive report on the condition of the Garden, Herbarium, and Library, in which he made many pertinent criticisms and suggestions, some of them reflecting directly or inferentially on WALLICH's management, but not altogether justly, considering the financial conditions under which WALLICH had to labour after his return in 1832. Many of GRIFFITH's proposals were afterwards carried out, and others that were carried out were afterwards allowed to lapse. Even now there are no Natural Garden or Herbaceous Ground for the instruction of students, no Garden of Medicinal Plants, and no proper Economic Garden, all of which were advocated by GRIFFITH. He began his scheme of reorganization according to his own ideas with characteristic energy, but as he was soon transferred to Malacca he left behind him mostly all too enduring evidence of the destructive part of his programme. In 1846, the year of WALLICH's retirement, a map of the Garden shows the central part of the western half still pretty much as in 1816, evidently undeveloped, surrounded by the Agri-Horticultural Society's experimental area and a medicinal garden on the north and by nurseries and garden divisions on the east and south. The eastern half of the Garden was mostly a Sumac plantation, but by this time a road on the line of the present Kyd Avenue ran right through it from west to east. After an interregnum during which G. M'CLELLAND officiated, HUGH FALCONER became Superintendent in 1848, and held office until 1855.

Early in 1848, while M'CLELLAND was still officiating, Sir JOSEPH HOOKER visited the Garden before starting on his famous journey to Sikkim, and again on his return to Calcutta in 1850. He refers in his Himalayan journals to the unsightly wilderness the Garden presented in 1848, due to the wholesale destruction wrought by GRIFFITH. It is just possible that too much was laid at GRIFFITH's door, for the severe cyclone that ravaged the Garden in 1842 may have been to some extent to blame. In 1850 HOOKER pays tribute to the transformation brought about by FALCONER in the two years. To FALCONER is due the first formation of the Palmetum, and of the collection of Bamboos and Screw-pines that still form features of the eastern half of the Garden. HOOKER's remarks indicate how much work still required to be done to develop the Garden to the best advantage, and the crippling effect of its limited budget having to be expended on drainage and embankments.

From 1855 to 1861 THOMAS THOMSON was Superintendent. Soon after his appointment he submitted a comprehensive and enlightening report on the state of the Garden. He laid stress upon the difficulties of carrying out any improvement owing to the hampering limits of expenditure laid down in 1830 and still in force in his time. Up to his time plants had been gratuitously distributed to all applicants, and he complained that the cultivation and distribution of such large quantities taxed the resources of the Garden to such an extent that more important objects had to be neglected, and that it had been a matter of extreme difficulty "to prevent the Garden from having the appearance of—what it is in reality—a gigantic nursery garden." He mentions that there were no carriage roads, so that the public were practically excluded for the greater part of the year. The Finance Commission of 1830 had allowed nothing for the Library, and practically nothing had been added to the Library since 1830. Such was the state of things seventy years after the Court of Directors had assured the Government in Calcutta that it was by no means their intention to restrict the Indian Government in the matter of expense. The gratuitous distribution of plants to all applicants ceased in 1857, but to this day plants continue to be liberally distributed to official institutions and public bodies. Work was further hampered by the general rise in the price of labour, which even then was troubling, so that it is not to be wondered at that the garden suffered from starvation. THOMAS THOMSON was succeeded by THOMAS ANDERSON in 1861. By this time the Honourable East India Company had been dissolved and the Garden became Her Majesty's Botanic Garden, and up to within the writer's recollection continued to be so designated by one particular department of Government. When exactly it began to be generally styled Royal the writer has failed to discover.

ANDERSON had his hands more than full. A method not unknown to Government Financial Departments in India of practising economy, especially in scientific work, is to entrust an officer who is or should be fully enough occupied with the work of his proper post, extra duties with or without a designation of high sound and an allowance of low scale. WALLICH was not only Superintendent of the Honourable East India Company's Botanic Garden, but also Professor of Botany at the Medical College in Calcutta, and for eleven years in charge of all the Government Teak plantations in Bengal, with the designation of Superintendent-General of Plantations. So ANDERSON was not only Superintendent of the Garden and Professor of Botany, but also the first Conservator of Forests for Bengal and in charge of the introduction and cultivation of Cinchona. With all these duties he could give only a small part of his time to the Garden, but as it happened this was not to be of much consequence, for the elements disposed of all garden work for most of his tenure of office. In 1864 occurred the great cyclone of Calcutta. It was accompanied by a storm wave from the Hooghly that laid the greater part of the Garden under water,

in some places to a depth of six or seven feet, and carried two ships into the Garden with great violence. Over a thousand trees—at least one half of the total number in the Garden—and innumerable shrubs were prostrated. The survivors were much shattered, and scarcely a vestige of leaf, flower, or fruit remained. Three years later a less severe but still very destructive cyclone, in which over 750 of the surviving trees were blown down, completed the ruin. The removal of the wreckage occupied most of ANDERSON'S remaining time in the Garden, but before he left in 1868 he had planned and begun to give effect to the replanting of the Garden on a more or less formal systematic arrangement.

Between 1869 and 1871 C. B. CLARKE officiated as Superintendent until the appointment of GEORGE (afterwards Sir GEORGE) KING. When KING took charge of the Garden it was in a most unpromising state. The devastation wrought by the two cyclones had deprived it of all shade. A large extent was under coarse grass, and large parts were still, as they always had been, little better than swamps. Most of the roads were narrow, subject to flooding, and unfitted for carriage traffic, while the present ornamental lakes were represented mostly by unsightly channels and "tanks." ANDERSON'S plan of replanting the Garden on a formal systematic arrangement was proving a failure, and altogether conditions were discouraging.

KING set himself to the laborious task of practically remaking the Garden, and, liberally supported by the Government of Bengal, to whose control the Garden had now been transferred, through many years he persevered until the Garden was developed into its present state. In 1872 the last part of ground occupied by the Agri-Horticultural Society's garden had been handed back, so that KING had at his disposal the entire area of the Garden as it had been from 1820 to 1836. Instead of continuing the formal systematic arrangement that was proving unsatisfactory, KING treated the entire Garden for landscape effect. A series of lakes were excavated and the soil utilized in raising the general level of the Garden and producing pleasing undulations. The various lakes were connected by a system of underground channels and a pumping engine erected to keep the lakes at a proper level by water from the river. The present Orchid-house, small Palm-house, large Palm-house, and the Herbarium were all erected. Most of the existing roads were remade and widened and new ones constructed. As the Government resolution on the Annual Report of the Garden for 1882-83 expresses it: "The change in the whole aspect of the gardens since the scheme was undertaken is scarcely to be understood except by those who have seen them under both conditions."

The Garden as left by KING in 1898 was arranged almost purely for landscape effect, of which it is a beautiful example, far surpassing any previous appearance in its history. Trees and shrubs were planted out massed in groups, not necessarily with any regard to natural affinities or country of origin, although in some parts, such as the

Palmetum and Bambusetum, species of one family lending themselves to artistic effect were collected together. The groups were originally planted rather thickly, partly to allow of the hardier and quicker growing species acting as nurses to the more delicate and slower growing species, partly to minimize the risk of destruction from cyclones. Since KING's time general attention has been given to thinning dense masses so as to give opportunity of specimen trees developing and to opening up picturesque vistas from various points in the Garden.

A formal systematic arrangement of plants over the entire Garden is clearly unsuitable for a garden that is also a public pleasure resort. On the other hand, a botanical garden is essentially a scientific institution, and from that standpoint an arrangement adapted purely to landscape effect has disadvantages. It is, however, possible by adopting a geographical arrangement materially to modify these disadvantages without sacrificing the general effect. Accordingly Lieut.-Col. (now Sir DAVID) PRAIN, who succeeded Sir GEORGE KING, had, before he left India in 1904, sketched out a geographical plan of garden divisions, in accordance with which future plantings were to be regulated. Sir DAVID PRAIN's plan, with slight modifications, continued to be carried out by his successor as opportunity allowed. Obviously the indiscriminate destruction attributed to GRIFFITH had to be avoided, so that a consistent geographical arrangement could and can only be brought about over a long period of years without the landscape effect suffering.

The scheme adopted twenty years ago was to treat the Garden as a map of the world on Mercator's projection, the plants of India and Burma to occupy the central area of the large western part of the Garden, this area being again subdivided in accordance with the geographical subdivisions of the Indian Empire. To the west and south-west of the large central Indian area are the divisions for north-west Asia, Europe, the Americas, Africa, and Madagascar, and to the east of it the divisions for north-east Asia, China, Japan, the Philippines, Siam and Annam, the Malaya Peninsula and Archipelago, and Australasia, the last five being separated from the large central Indian division by the special collections of Palms, Screw-pines, and Bamboos. Scattered throughout the Garden are twenty-six irregular lakes, some of which are of large extent with islands. Altogether the lakes comprise about one-ninth of the total area of the Garden. Most of them were designed by KING with such skilful diversity of outline and surroundings as very greatly to enhance the beauty of the Garden.

The Garden contains about 10 miles of carriage roads, all built on brick foundations, which stood up excellently to horse-carriage traffic but are hard put to it to withstand the pressure of motor-cars. Some of the roads are magnificent avenues of single-species trees, all, with the exception of some fine old Mahoganies planted by ROXBURGH along the western boundary about 120 years ago, dating since the 1867 cyclone, and most of them laid down by KING. Amongst these

may be particularly mentioned the very fine avenue of Palmyra Palms extending from the north-east entrance for nearly half a mile along the north side of the eastern narrow part of the Garden; the avenue of large-leaved Mahoganies running from the south-east gate westwards for rather less than a quarter of a mile, a particularly beautiful sight at the beginning of the hot season when the bright green young leaves are all out; the superb avenue of Royal Palms (*Oreodoxa regia* H.B.K) flanked by a double row of Mahogany trees between the landing stage on the river bank and the Kyd monument, forming a truly regal vestibule to the Garden; the avenue of Madagascar Sirris (*Albizia Richardiana* King and Prain) planned by THOMAS ANDERSON and planted by C. B. CLARKE, which traverses the centre of the northern quarter of the large western part of the Garden. Later on Amherstia trees were planted to alternate with the Sirris trees. In spring, when the Amherstias are in flower, the contrast between the lofty crown-spreading Sirris trees, with their beechlike bark and delicate foliage, and the bushy Amherstias, with their glorious pendent scarlet racemes of flowers, is most striking.

In the Palmetum are many magnificent groups, composed of species of such genera as *Livisiona*, *Phoenix*, *Areca*, *Arenga*, *Didyosperma*, *Hyphaene*, *Elaeis*, *Sabal*, *Licuala*, *Latania*, *Cocos*, *Caryota*, *Corypha*, *Bactris*, *Chrysalidocarpus*, *Calamus*, *Bentinckia*, *Ptychosperma*, *Attalea*, etc. A botanically confusing assembly of different species of weird, stilted Screw-pines forms the Pandanetum to the south of the Palmetum, while to the east of the latter stretches the Bambusetum along both sides of the riverside road.

Characteristic features of the open garden are furnished by the abundance of lofty, sombre Casuarinas, and of rather aggressively umbrageous Rain-trees (*Enterolobium Saman* Prain). There is, in fact, rather a superabundance of these two kinds, particularly of the last, which grows quickly and with its enormous spreading branches takes up an inordinate amount of space, which might be better occupied by less common and more valuable species. There is a host of Fig-trees of many species, mostly scattered over the Garden, but here and there collected in groups. Amongst the Figs the Great Banyan is the most popular object of interest in the Garden. It occupies a roughly circular area on the north-west boundary of about a thousand feet in circumference, with several hundreds of aerial roots in all stages from pendent swaying filaments to trunk-like supports. There is another Banyan about a third of a mile to the north-east of the large one. Although it is called, relative to the large one, "the small Banyan," anywhere else it would be considered large. These two are the survivors of four large Banyans that were in existence in the Garden in the early years of last century. Of the other two, one was a short distance from the present large one, while the other was on the river bank near the western end of the Garden. The first soon disappeared, but traces of the riverside one were still in evidence towards the end of last century.



Three species of Mahogany are represented. Of the "true" Mahogany there are still in existence some fine trees already mentioned as planted by ROXBURGH over 120 years ago. Among other arboreal genera well represented are *Terminalia*, *Eugenia*, *Antidesma*, *Bombax*, *Pterospermum*, *Pterocarpus*, *Putranjiva*, *Dalbergia*, *Bischofia*, *Garcinia*, *Amoora*, *Sterculia*, *Mangifera*, *Cycas*, *Calophyllum*, *Crescentia*, *Litsaea*, *Peltophorum*, *Xylosma*, *Acacia*, *Diospyros*, *Stereospermum*, *Mitragyna*, *Anthocephalus*, *Parkia*, *Eucalyptus*, *Castanospermum*, *Courouppia*.

Probably the largest tree in the Garden after the Banyans is a gigantic specimen of an unidentified species of *Ceiba*. Fine colour effects are given in the spring by trees of such genera as *Butea*, *Lagerstroemia*, *Bauhinia*, *Sterculia*, *Erythrina*, *Cochlospermum*, *Milletia*, *Saraca*, *Cassia*, while climbers like *Bougainvillea*, *Petrea*, *Concea*, *Thunbergia*, etc., invest their supporting trees with a blaze of splendour. The shrubby inhabitants also play their part in the display, to which *Ixora*, *Daedalacanthus*, *Kopsia*, *Clerodendron*, *Hiptage*, *Ochna*, *Duranta*, *Hibiscus*, *Jasminum*, and many others contribute. In the cold weather months of December and January the flower-garden is bright with the annuals of home.

The only glass-houses in the Garden are in the main nursery, and shelter the collections of Cactaceae and other succulents and of the more delicate ferns. There are also three large plant-houses in the Garden. These were designed by KING to permit the cultivation of truly tropical species, which could not withstand the severe climatic conditions of the open garden. They are constructed of an open iron framework enclosed by wire netting. Creeping plants are allowed to cover the sides and roof, the latter being also, when necessary, further protected by thatching grass thinly applied. The result is a temperature and moisture sufficiently equable to allow of the cultivation of a large number of species that otherwise could not survive the extremes of a Calcutta May and December. The largest of the houses is the Palm-house, an octagonal structure with a fifty-foot-high dome. It contains a rich collection of tropical Palms, Aroids, and other species. The other houses are rather cathedriform in plan and low and contain a varied collection of less aspiring species than Palms. In one of them usually a fine display of Orchids is arranged about the end of the cold season. Amongst the creepers that cover the roof of the large Palm-house are the pink and the white *Antigone*, which give a fine effect when in flower. Surpassing these in loveliness is the "bridal Creeper" (*Porana paniculata* Roxb.), which, ascending from the interior of the large Palm-house in a confused tangle of cable-like stems, spreads over the exterior of the dome. When it flowers early in the cold season the dome is covered with a veil of snowy whiteness, which endures all too briefly.

In a garden so large as the Calcutta one, arranged mainly for landscape effect and broken up with so many lakes, the rather indiscriminate—from a purely botanical standpoint—scattering of

species makes it difficult to keep count of their position unless it is precisely recorded. To enable this to be done, the garden was re-surveyed in 1907-08 and a new map prepared. On this map the Garden was divided into squares of 100-foot sides, the squares running due north and south and denoted by letters and numbers. Here and there throughout the Garden itself the intersections of the lines bounding the map squares are indicated by strong T-iron posts, each post having stamped on its flat north face the letters and numbers of the four surrounding squares. The position of each post is indicated on the map by a small circle round the intersection of the squares.

In 1908-09 the whole Garden was gone thoroughly over, and every individual shrub and tree in the open—except trees of the same species forming an avenue—numbered and ticketed with a zinc label stamped with its number, the numbers going on consecutively irrespective of the squares, but the numbers in each square preceded by the distinguishing letter and number of the square. At the same time each plant was identified as far as possible. In this way a numerical list was formed which, combined with an index to the squares themselves, has made it possible to lay hands on any particular numbered plant merely by consulting the list in conjunction with the squared map. This numerical list was published in 1912 (*Rec. Bot. Surv. Ind.*, vol. v.), but the companion systematic list is still unfortunately in manuscript only. In the open garden there are about 13,500 individual trees and shrubs. The Garden, however, is by no means so rich in species as it might be, the total in the open probably not exceeding 2,000. Certain species, apart altogether from avenues, are represented in large numbers, such as *Casuarina equisetifolia*, *Swietenia Mahogani*, *S. macrophylla*, *Elaeodendron glaucum*, *Mangifera indica*, *Dalbergia Sissoo*, *D. lanceolaria*, *Saraca indica*, *Terminalia Catappa*, *T. Arjuna*, *Amoora Rohituka*, etc.

The limits of this article forbid any account of the purely botanical activities of the Garden and allow only a brief reference to the economic side of the garden work. The introduction, experimental cultivation, and distribution of economic plants, for which the Garden was founded, have formed a large part of its work in the past. The Garden has not only prevented much unprofitable expenditure of labour, money, and time by demonstrating the unsuitability of many economic species for cultivation in Bengal, but has also aided greatly in the introduction or improvement of a host of products, such as tea, cinchona, potatoes, cotton, jute, sugar-cane, flax, hemp, rhea, sisal hemp, tobacco, coffee, cocoa, ipecacuanha, rubber, indigo, etc. Although since the establishment of scientifically staffed Agricultural and Forestry Departments there has been less need for the Garden to concern itself with general economic questions, in one direction economic work consumes more of the Superintendent's time than ever, for he is in charge of the cinchona plantations and quinine factory in the Darjeeling district, which have greatly expanded in the last twenty years, and as Director of the Botanical Survey of India he is also in charge

of the Government of India cinchona plantations in Southern Burma, and of the Industrial Section of the Indian Museum in Calcutta, which deals with plant products not taken up by other departments and houses a large exhibition gallery of plant products.

The Garden labours, as it has more or less always done, and as all such gardens in the British dominions do, under the difficulties of paucity of staff, both scientific and horticultural (there are only two, including the Superintendent, of a scientific staff, and only three of a horticultural), insufficient equipment (there is no laboratory, for instance), and heavy routine demands. Although THOMSON'S remark as to its being "a gigantic nursery garden" has long ceased to be applicable, the Garden still distributes annually from 25,000 to 50,000 plants for roadside planting and other purposes. The total annual expenditure used until a few years ago to be over £7,000, but since unavoidable retrenchment has been the order of the day the allotment has been considerably reduced. In present circumstances one can only hope for a brighter prospect to dawn in the future and enlightened recognition by those in authority of the great possibilities of the Garden and the need and advantage of allowing them to be realized.

## THE LINDLEY LIBRARY.

By E. A. BUNYARD, F.L.S.

## THE HARMAN PAYNE SALE.

THE sale of the late Mr. Harman Payne's library enabled the Society to add a considerable number of books to the Lindley Library. They consist very largely of small pamphlets and books on florists' flowers, and especially those dealing with the Chrysanthemum.

There are also a few books of great rarity and interest to students of Floricultural History which are valuable additions. Among these may be mentioned "*Le Floriste François*" by La Chesné Monstereul, published at Caen in 1654. This is the earliest monograph of the Tulip and one of the earliest of all floral monographs. Another Tulip rarity is the "*Histoire des Tulipes*" of C. Malo, Paris (c. 1850), a companion volume to his "*Histoire des Roses*." Interesting details are given of the introduction of the Tulip to France and especially Paris. The "*Traité sur la jacinthe*" of G. Voorhelm, one of the earliest Hyacinth cultivators, is of interest as being the second edition, the only one containing the author's portrait.

The "*Nouveau traité pour la culture des fleurs*" by P. Morin, 1764, recalls this important and early family of nurserymen at Paris who did so much to introduce new plants into English gardens. Evelyn's visit to Morin's garden and collection of curiosities will be remembered. Other interesting French books are *Le Sieur Guenin* on Auriculas, 1735, and the anonymous "*L'art de former les jardins modernes*," with its description of Stowe. Among the rarer English books are Furbur's "*Flower Garden display'd*," London, 1734, with its twelve plates of flowers grouped after the Dutch manner; "*The Florist's Delight*," London, 1791, notable for its sidelights on florists and the flowers of the day; Maddock's "*Catalogue of Flowers, etc.*," London, 1792, possibly unique. Scotland gives us the "*British Gardener's Calendar*," Edinburgh, 1759, a scarce book, written with equal enthusiasm and knowledge. Roessig's "*Die Nelken*," Leipzig (1806-8), with its curious plates of Carnation petals, deserves remark.

The forthcoming catalogue of the Lindley Library will be greatly augmented by the purchases made at this sale, and in procuring these books and so preserving them for all time for the study and use of our members we are fulfilling the expressed desire of their late owner.

## NURSERYMEN'S CATALOGUES AND THEIR VALUE.

All book collectors know by experience that ephemeral publications are most difficult to find. Rare volumes are preserved and prized, but the tracts of topical interest, such as the early cookery and gardening books, have in most cases been thumbed out of existence. For

the major part this is probably no serious loss, but where such volumes contain facts of historical value their extinction is greatly to be regretted. Into this class fall nurserymen's catalogues, and their value to the horticultural historian and also to science is often considerable. To our Society they have a further value, namely, the proof they give of the origin of plants and its bearing on the awards given.

There are some, and indeed we have actually encountered them, who say "As long as I have a good garden plant I care not when or by whom it was introduced." This is a shortsighted view. The provenance of a plant is often a fact of great value, and the date of its introduction may be of cardinal importance in tracing hybrid origins. For the historian of our craft a word too can be said. In other branches of science it is now being realized that the historical view is necessary even to those who look forward mainly to future developments. We too should know what has been done by our predecessors in building up new varieties of plants, and can learn by their failures as well as by their less frequent triumphs. A large amount of this information is contained only in the ephemeral catalogues of nurserymen, amongst whom happily there have always been many real amateurs in the French sense of the word. The catalogues of great firms like Lawson of Edinburgh, Veitch, Lemoine, etc., have more than a mere commercial interest. To them the scientific man, who now realizes that the "varieties" of horticulture are often as important as the "species" of the botanist, will turn for a study, it may be, of the limits of hybridization of unit characters, of variegation and the appearance of mutations. The gardener may gain useful hints as to propagation and culture, and the historian of horticulture finds in them "original sources" of the greatest value.

It is greatly to be hoped that all members will therefore assist the Society in their desire to build up in the Lindley Library a large collection of nurserymen's catalogues, where they will be available to all who realize their value. Current catalogues may be saved from an untimely death in the waste-paper basket, and, still more important, those who collect and file catalogues could not do better in the interests of horticulture than leave them to the Lindley Library, where they would be preserved for the benefit of future students. Many such collections of the greatest value have been destroyed because the average auctioneer has thrown them aside as unsaleable.

Parcels of catalogues, old and new, will be very gratefully received by the Society, and should be addressed to the Librarian, Vincent Square.

## THE AWARD OF GARDEN MERIT.—VII.\*

## 43. COTONEASTER HORIZONTALIS.

*Award of Garden Merit, April 6, 1925.*

SHRUBS and trees beautiful in fruit in autumn are gradually extending their sway in gardens, and this tendency has been strengthened by the great influx of such shrubs from China in recent years. The genera which beyond all others have furnished such shrubs for our gardens are Berberis, Stranvaesia, Pyracantha, and Cotoneaster, and it may be that we shall add Lonicera also. There are many beautiful species of Cotoneaster and practically all are hardy anywhere in Great Britain, at any rate when they have passed their first youth; and *C. horizontalis*, while no claim is made that it is the best of the genus, is, in its place, one of the best. It was introduced (from China) some years ago and described and well pictured by ANDRÉ in "Rev. Hort." 1889, p. 348, and since then it has spread widely. The genus may be divided into two groups, according to the pose of the petals; in one group they are held erect, in the other they are spreading, and in both groups there are dwarf, close-growing species with small leaves, suitable for cultivation on banks and slopes, and even on the large rock-garden. *C. horizontalis* is a member of the former *C. microphylla* of the latter group. Among related species *C. horizontalis* is distinct by the curious flat branching which characterizes it. The branches are in two rows, one on each side of the main axes, and they hold themselves stiffly at a wide angle with these axes and in the same plane. If the plant be growing in the open the branches spread horizontally and a low bush results; if on a wall they spread fanwise and grow much higher, keeping close to the wall. There is one such on the Laboratory wall at Wisley, self-sown, well placed, and very pleasing all through the year, but most when every ultimate twig is studded with the bright scarlet berries, as it is every autumn and often until spring, for the birds rarely touch them (though mice do sometimes). It loses most of its leaves gradually during the winter, but not until they have for long helped the colour scheme of its berries by themselves turning orange and red. At first they are deep glossy green and set close along the shoots so that the shoots cannot be seen; they are about  $\frac{1}{2}$  inch long and almost glabrous, while the branches are covered with thick brown hair. Any loamy or sandy soil will suit it, and its seedlings are apt to spring up here and there, almost too freely when on a rock garden.

\* For earlier annotated lists of Awards of Garden Merit see vols. 47, p. 189; 48, pp. 58 and 223; 49, p. 233; and 50, pp. 100 and 260.

## 44. RIBES SPECIOSUM.

*Award of Garden Merit, May 4, 1925.*

For one reason or another *Ribes speciosum* is a plant little grown, and it is difficult to understand why. Currants and gooseberries considered as ornamental shrubs are perhaps not plants of distinction—a little commonplace, or, for most of the year, a little dull—yet some members of the genus are well worth a place in the shrub garden, some for their flowers, some for their autumn colours; but none is of such distinction and beauty as *R. speciosum*, and none so well worth a place the year round. Even those who grow it, grow it generally against a wall, and, at any rate in the south, give it quite unnecessary protection. Some say it looks best there, but for our part we think it more beautiful as it grows at Wisley—a bush six or seven feet high and as much through, laden with rows of pendent clusters of rich red flowers, for all the world like little Fuchsias and meriting the name once given it, *Ribes fuchsioides*. They set off well, in April and in May, the reddish spiny bristled branches which spread almost horizontal in all directions from its numerous stems as they depend from beneath the glossy green rather small lobed leaves. The bush, bare or partly so in winter (but not unpleasing then from the colour of its bristly branches), becomes green early in February and is then sometimes cut by very severe frosts. It is best raised from seed, which is produced in some seasons at Wisley in small bristly red gooseberries here and there on the bushes, or from layers, for cuttings do not strike very readily. Ordinary loam suits it well. MENZIES discovered it in California about 1793, and according to LOUDON it was introduced by A. B. LAMBERT in 1829, but LINDLEY says that it came from Monterey in the hands of a naval surgeon, COLLIE, in 1828. It is figured in the *Botanical Magazine*, t. 3530; and in the *Botanical Register*, t. 1557.

## 45. RHODODENDRON THOMSONII.

*Award of Garden Merit, May 4, 1925.*

When Mr. WILSON first made the wild garden in Oakwood, as the part of Wisley he owned was then called, he planted Rhododendrons here and there, and among them on the edge of a ditch sheltered on the east and north by oak trees and open to the west a row of *Rhododendron Thomsonii*. Every year now they give a glorious display of blossom in March or April, though every year that display is apt to be cut short by one of the late frosts to which Wisley is so subject; yet for that short beauty they well pay for the ground they occupy. Though they do not approach the magnificent proportions the bushes attain in more favoured districts, yet these eight-foot-high shapely plants, in the best of health, covered with roundish oval dark green leaves, blue white beneath, are always pleasing, and especially so when the young blue-tinted foliage develops (alas! at times too soon), but

most of all when the loose clusters of rich blood-red flowers (we think Mr. WILSON must surely have picked out the plants for their good colour before he planted them here) cover the bushes from the top almost to the ground, each cluster with six or seven flowers, each flower  $2\frac{1}{2}$  inches across, a brilliant red open bell set off by a pale smooth calyx remarkably large for a *Rhododendron*. Introduced by HOOKER in 1849 from Sikkim and flowered in 1857, though so long in our gardens, and in spite of the numerous introductions since, it still holds its own and is worth a place in every garden where space, soil free from lime, and shelter, can be given it. A figure is given in the *Botanical Magazine*, t. 4997, and HOOKER's plate in "*Sikkim Rhododendrons*" (t. 12) pictures it well.

#### 46. RHODODENDRON HIPPOPHAEOIDES.

*Award of Garden Merit, May 4, 1925.*

The great family of *Rhododendrons* is represented in most gardens where the soil is free from lime by hybrids of *Rhododendron ponticum*, *maximum*, and *catawbiense*, by Ghent and mollis Azaleas, and by little else, and yet no genus of plants is so rich in beauty as this. It is true that many, especially among the species introduced in the nineteenth century, are not hardy enough to withstand the rigours of an English spring, and a few are likely to be damaged even in an English winter, but many are now known that will, with overhead shelter of oak and birch, survive both, and help to make the garden more full of interest and beauty between December and June than ever before. Many *Rhododendrons*, however, are too large for any but large gardens and cannot be accommodated in the ordinary shrub border or in the rock garden, but twentieth-century explorers in western China, northern Burma, and the Tibetan border have collected many dwarf species which may find a home in any lime-free garden, no matter how small, where beautiful and hardy flowering shrubs are valued. *R. racemosum* was first in French and then in English gardens at the opening of the century, and since its introduction WILSON, PURDOM, FARRER, FORREST, and WARD have each added new species of similar dwarf and compact habit. Some are becoming well known. *R. intricatum* is fairly common, and excites curiosity and pleasure because of its almost blue flowers profusely borne in spring, and sometimes also in autumn, even on bushes but a few inches high and while quite young. *R. hippophaeoides* is even better. At Wisley it makes a closer bush, well covered with its small scaly leaves, fairly erect in growth, and flowering in April profusely with deep lilac-blue flowers. It is planted on a rather steep bank where the soil is sandy peat, protected from wind, and shaded from hot sun; exposed in fact only to the sunlight that filters through the branches of near-by oak trees. Plants put in in 1917 have flowered well every year and are now about 18 inches high and 15 inches through.

*R. hippophaeoides* has leaves green above, and quite covered with



shining grey scales beneath, rather larger than in *R. intricatum*. The leafy shoots which bear the flower trusses are short and many at the end of the branches, and each truss consists of six or seven flowers. The grouping of the flowers is well shown in fig. 66 of our last volume. The flowers are quite distinct from *R. intricatum*, for both stamens and style project well beyond the corolla tube. The stamens are 8 to 10, and they exceed the glabrous style in length.

Both KINGDON WARD and FORREST collected this species in 1913 and sent home seeds (K. W. 269B and Forrest 10433 and 11487), and FORREST has subsequently collected it on several occasions in Yunnan at an altitude of 10,000 to 14,000 feet. It forms carpets or scrub from 9 inches to 4 feet in height in open boggy, peaty meadows, or in open pine forest in the Yunnan Mountains.

#### 47. PRIMULA PULVERULENTA.

*Award of Garden Merit, May 4, 1925.*

In the great genus *Primula* there are few species unworthy a place in our gardens, but there are many that do not live long there, for there are many adapted for life under very special conditions the exact significance of which we fail to apprehend and the cultivation of which we cannot, therefore, compass; or they are biennial and either niggard of their seed or delicate in their youth. *Primula pulverulenta* fails in neither of these ways. It is robust and perennial, adaptable and lavish in its seeding, and is, one might say, everybody's plant. Even in smoky districts in London it grows well. It may even be used in bedding-out schemes, but is at its best on the moist edge of the bog garden. It seems perhaps a little less tolerant of shade than *P. japonica*, which makes such a brave show every year in the Wisley Wood, but even there it behaves well; but its full beauty is seen on the edges of the ponds, and near *Viburnum Carlesii* and the bog orchids. It presents no difficulty in raising from seed, and if need be its roots may be divided.

*P. pulverulenta* has leaves rather more refined than those of the better known *P. japonica*, a rather more slender stem, numerous purple flowers borne well on longish pedicels tier on tier, and is well marked by the copious meal that gives a silvery touch to all the flowering stems which rear themselves straight and clean from amid the pleasant leaves, and makes for refinement (but not weakness) against the robustious good temper of *P. japonica*.

E. H. WILSON collected *P. pulverulenta* in W. China and sent home seed of it to Messrs. VEITCH in 1905. It not only quickly established itself, but (unlike *P. japonica*, which rarely crosses) soon became the progenitor of beautiful hybrids, first with *P. Cockburniana*, its orange-yellow cousin, which came from the same collecting expedition at the same time, and produced 'Unique,' and later with *P. Beesiana* and *P. Bulleyana*, and perhaps other members of its section, and rarely beautiful many of them are.

*P. pulverulenta* has also varied to paler and pink forms; it began indeed to do so with Messrs. VEITCH prior to 1913, and it has lately given Mr. DALRYMPLE at Bartley a series of pale-flowered varieties which may be seen at our Shows in late spring and will soon be in every moist garden in the country.

#### 48. ANEMONE NEMOROSA ALLENI.

*Award of Garden Merit, May 4, 1925.*

*Anemone nemorosa* is our common wood anemone, and it has in its wide range given rise to a great number of different colour varieties, different forms of flower, and different sizes of plants. Woodland conditions serve best for this species or at least some shelter from the mid-day sun and leaf soil underneath in which the far-spreading underground stems may run and root freely. The best of these varieties that can be easily procured and most easily grown is *A. nemorosa Alleni*. It has large flowers of an exquisite lavender-blue of a very clear tone and blooms late (but 'Blue Bonnet' is even larger and later). It is a sturdy-looking plant but lacks nothing in grace, and grace is an attribute of *Anemone nemorosa*.

#### 49. PRIMULA ROSEA.

*Award of Garden Merit, May 4, 1925.*

The name *Primula rosea* in the large sense covers a range of relatives closely allied to one another and having similar cultural requirements—damp or boggy soil or even running water in sun and shade. It likes least attempts at confining its range, and it will seed freely and spread naturally where it is at home, as well as increase in bulk so that it may be divided. If a particularly desirable form should arise, the lower part of the shoot may be broken up, and with a little care every piece will make a plant; and where the plants seed it is by no means rare for good forms to appear. Everyone knows the plant—its beautiful rose-carmine heads of flower coming up from an almost leafless rhizome which only later gives rise to a rosette of glossy leaves; and it is especially desirable for it comes in early spring, the forerunner of a mighty host of good things in the rock garden. Perhaps the best of its forms is the very bright one named 'Brockhurst var.' after the home of Mr. F. J. HANBURY, where it originated and whence its generous donor sent it to Wisley. A coloured plate in the *Bot. Mag.* t. 6437, under the name *P. rosea*, is *P. elegans*, one of the many forms which have been segregated in the *rosea* group.

#### 50. ROSA ALTAICA.

*Award of Garden Merit, June 8, 1925.*

Most botanists regard *Rosa altaica* as a variety of the British species *R. spinosissima*, but for garden purposes it is so distinct that we may

forsake the majority and, following WILDENOW, give it a separate name, but those who wish to purchase it may often find it listed under 'Scotch Roses,' or as a variety of *R. spinosissima* or even as a variety of *R. pimpinellifolia*. *R. spinosissima* is very widely distributed (often in sandy soil and frequently, unlike many roses which are impatient of salt, near the sea) in Europe and northern Asia. It is a native of Siberia, and is larger in all its parts than the Scotch rose; it has its full complement of spines, but comparatively few bristles occur among them; it is upright in growth, reaching to 5 or 6 feet eventually, suckers freely, and may be freely propagated by its suckers. It flowers in May and then covers the bush with its creamy-white flowers, each 3 inches across, and it bears them in less profusion on and off through the summer. It is so beautiful in May that no one who has been advised to walk the journey of half a mile from the main garden to see the plant has expressed regret at his enterprise! It is not particular as to soil (at Wisley it grows on a sandy bank, and in Mr. BOWLES' garden, whence it came to Wisley along with so many other good plants, in loam over a rather calcareous gravel), and we commend it to all who are not dissatisfied because a plant does not retain its full beauty more than a month.

#### 51. ROSA MOYESII.

*Award of Garden Merit, June 8, 1925.*

In our native roses we are accustomed to see flowers of various shades of white and pink—always beautiful and often disposed gracefully. Exotic roses provide other shades, and in *Rosa Moyesii* we have flowers of deep red somewhat like those of the Austrian Copper Rose, *R. lutea punicea*, so far as the red (without its yellow) is concerned, but borne on a plant much more amenable to cultivation. *R. Moyesii* is a perfectly hardy vigorous bush up to 8 or 10 feet in height, with sturdy arching prickly branches, bearing 2- to 3½-inch-wide flowers singly or in pairs freely in June. It has a second and longer period of beauty when its curious bottle-shaped rather hairy fruits are ripe, for they are an inch and a half long, pendent from the branches, bright scarlet and numerous. It is not fastidious as to soil, and should be given room to develop its 8-foot spread of branches so that it may the better display its charms and show itself to be, as it is, one of the most attractive of wild roses. Mr. PRATT found it in 1890,\* and E. H. WILSON collected seed for Messrs. VEITCH in W. China in 1903. It was shown in flower at Vincent Square by Messrs. VEITCH in June, 1908, when it received A.M., and is now widely distributed in gardens.

Seedlings vary somewhat from the parent, and one with pink flowers has received a specific name in gardens, viz. *R. Fargesii*, and might be distinguished as *R. Moyesii* var. *Fargesii*.

\* It was figured in our JOURNAL, vol. 34, p. cxxx (1909), but the note published there was certainly not sufficiently appreciative—or perhaps our idea of values has altered. It is also figured in *Bot. Mag.* t. 8338.

52. *ROSA HUGONIS*.*Award of Garden Merit, June 8, 1925.*

*Rosa Hugonis* is another Chinese species, and forms nearly as vigorous a bush as *R. Moyesii*, but with bright yellow flowers borne singly on short shoots along the main branches. In common with *R. sericea* and *R. omeiensis* this species flowers very early in the rose season—its flowers being at their best in mid-May—but it differs from those species in its five-petalled flowers followed by smooth round black fruits. Its leaflets are rather small, but the leafy mass of the bush gives a beautiful effect through the summer. It was raised at Kew in 1899 from seed sent home by Father HUGH SCALLAN, in honour of whom the late J. B. HEMSLEY named it. It was figured in *Bot. Mag.*, t. 8004.

53. *CEANOTHUS* × 'GLOIRE DE VERSAILLES.'*Award of Garden Merit, June 8, 1925.*

Many species of *Ceanothus* bear blue flowers, and since blue is a favourite colour in the garden and rare in shrubs they are particularly precious. *Ceanothus* × 'Gloire de Versailles' is not a wild plant, but was raised on the Continent (where many hybrids have been raised by crossing *C. americanus*, *C. ovatus*, and *C. azureus*), and of these it is one of the best and hardiest, having taken the large clusters and rich blue flowers (though not quite so deep in shade) of *C. azureus* and avoided to a large extent the tenderness of that species, which is rarely happy in England away from a wall. It makes a large rounded deciduous bush, and is rarely injured in winter to any great extent, even at Wisley, but it is wise to postpone pruning until April. It flowers very freely from July until frost comes and stops it, and its habit of flowering in late summer and autumn is another circumstance in its favour, for then the flowering of shrubs is rare.

54. *CEANOTHUS* × *VEITCHIANUS*.*Award of Garden Merit, June 8, 1925.*

*Ceanothus* × *Veitchianus* is another hybrid, its parents being *C. rigidus* and *C. thyrsiflorus*, the former having short-stalked umbels of purplish-blue flowers set closely along the stiff evergreen shoots in the axils of short, glossy, dark-green opposite leaves, the latter with rather long roundish clusters of pale blue flowers in the lower part of the alternate evergreen glossy-leaved branches.

*C. rigidus* was sent home to our Society by HARTWEG from the Monterey region of California and is very tender, while *C. thyrsiflorus*, from the Santa Cruz Mountains of California (where it grows to 45 feet or so in height), is hardy enough to stand out in the open garden.

LOBB introduced *C. × Veitchianus* when collecting in California

for Messrs. J. VEITCH about 1853, and in it we have a natural hybrid which has not been found wild since.

It is, on the whole, best against a wall, but may be trusted in sheltered spots in the open. It has glossy evergreen leaves, grey beneath, with pinnate veining, and dense heads, about 2 inches long, of flowers of a deep bright blue. On a wall the plant will attain to about 10 feet in height.

These two *Ceanothuses* demand nothing particular in the way of soil so long as it is well drained and moderately rich, and they are readily increased by cuttings of half-ripe shoots, put in in late summer.

*C. × Veitchianus* was figured in *Bot. Mag.* t. 5127, but Mr. BEAN in his "Trees and Shrubs" points out that an error has crept into the description there, for the shoots are not in fact smooth, but downy.

## WISLEY ROSE TRIALS.

It is no uncommon thing to hear complaints that the behaviour of plants in gardens by no means comes up to the expectations formed when the plant is seen at an exhibition. This is natural, and in few things more common than in Roses; for a Rose excellent on the exhibition table may make but a poor show in the garden, even though its cultivation be of the best. It follows that selection of Roses for one's garden at exhibitions often results in disappointment, and that awards made at exhibitions are no real guide to the value of a Rose for garden decoration.

In view of this the Council of the Royal Horticultural Society instituted a trial at Wisley for Roses, and it has now been in progress for three years. Raisers were invited to send their new Roses to be planted side by side with certain well-known varieties, in order that comparison might be made. Each variety is represented in the first place by six plants, and these are grown for two or three years and notes made upon their behaviour and characteristics during this time before any judgment is passed. A Committee, consisting of the Rt. Hon. the Lord Lambourne, P.C. (Chairman), Mr. W. Cuthbertson (Chairman of the Wisley Committee) (Deputy-Chairman), Mrs. Wightman, Dr. A. H. Williams, Dr. Lamplough, Mr. H. R. Darlington, Mr. H. Wettren, Mr. A. Holland, Mr. T. Hay, Mr. Coutts, Mr. G. Taylor, Mr. A. Dickson (jun.), Mr. Prince, Mr. Easlea, Mr. Poulsen, and Mr. Pernet Ducher, was appointed to examine the Roses from time to time and to recommend awards. This Committee met three times in 1924 and four times in 1925, and on each occasion "pointed" the varieties which appeared most to deserve it. At the end of each season the marks were collated, and upon these judgments and the records of behaviour made at Wisley recommendations for awards have been made.

It should be understood quite clearly that the duty of the Committee is to adjudicate upon the Roses growing in the trials solely so far as their value for garden decoration goes. They are not called upon to express an opinion as to the potentialities of a variety for growing for market, nor upon its probable value as a producer of exhibition flowers. Their recommendations are made with the idea of guiding planters in their choice of Roses likely to give a good account of themselves in an ordinary garden under ordinary good cultivation.

The points to which chief attention is paid are :

- (1) Hardiness; for a tender Rose is of little value in the open garden, no matter what its other qualities may be.
- (2) Habit; for unless the plant makes a shapely and vigorous growth its other good qualities are not enough to justify it a place for garden decoration.

(3) Foliage ; for handsome, healthy foliage, carried well into the autumn and well placed on the bush, is a great asset in a garden Rose.

(4) Freedom and length of flowering period ; for a few Roses borne now and then, no matter how good, can scarcely compensate in the garden for the absence of frequent crops of many flowers such as some varieties will produce.

(5) Colour. There is no need to dilate upon the value of clear over muddy shades, nor the disagreeableness of blue tints as a Rose dies.

(6) Shape, even though not for exhibition, where colour and shape are almost all-important, is a great recommendation when pleasing, and a great drawback when irregular and ill-proportioned. Size of truss and arrangement of the flowers also count for much.

(7) Fragrance is most desirable and scores heavily, but at present we cannot wholly condemn a Rose which lacks it, else our gardens would miss much that delights the eye.

Other characters need also to be considered, e.g. whether the flowers last well, whether they grow old gracefully, how they behave in stress of adverse weather, whether the plants are slaves of mildew or are attacked badly by black spot, and the like.

The Council has instituted a special "Wisley Rose Award," to be given to the Roses adjudged worthy. It is given in two grades, I. and II., and it should be noted that the Committee may recommend the advance of a Rose from Grade II. to Grade I.

As will be seen from the list which we give below, a large number of varieties are growing in the trials, and the judges' task is no easy one. It is little use giving the names of those which have been selected for award without the names also of those growing there which have been passed over or have yet to be proved, but there is some danger in reciting the full list lest it be assumed that those to which no award has so far been made are unworthy. It may be that they have been under trial too short a time to warrant an award, and this should be borne in mind in comparing the lists. Those to which awards have been made have been proved good ; some of the others have proved unsuitable and will in time be discarded ; some have been sent into the trials on apparently unsuitable stocks (briars suit our conditions—and most conditions—best) ; some are new and have not recovered yet from a perhaps very long journey, for there are Roses in the trial not only from every part of Great Britain, but from almost every European country, from North America, and from Australia as well ; so, that a Rose in the trials has not had recognition in the way of award at present must not be taken to condemn it.

Surprise is often expressed that Roses succeed as they do in the light soil of Wisley, since it is so generally (mistakenly) assumed that heavy soils alone suit Roses, and a word or two concerning the treatment of the soil may not be out of place.

The site of the Rose trial ground was an arable field until the winter of 1921. The land was well ploughed and manured with farmyard manure and a dressing of superphosphate and sulphate of ammonia

in preparation for a potato crop. The potato yield was satisfactory, and after the crop had been taken off the beds were dug two spits deep (bastard trenched) in the autumn before the Roses were planted, no further manure being given. When the Roses had been growing a year in February 1924 a dressing of partially decayed farmyard manure was put on the beds, and after lying for five or six weeks it was lightly pricked in, so as to cover it with as little disturbance to the roots as possible. This treatment will be continued, with the probable addition of a dressing of bone meal to provide phosphates.

We give below :

(1) A list of varieties to which the Wisley Rose Award has been made, with notes on their behaviour at Wisley, source, and so on.

(2) A list of all other varieties under trial.

It may be of interest to Fellows to know that near the Rose trial ground a large number of species of wild Roses are planted, as well as many old-fashioned Roses of a century and more ago, which are not included in the following lists.

#### WISLEY ROSE AWARDS.

For purposes of judging, the Roses in the trials are divided into four groups: Climbing varieties, semi-double and double dwarf, single dwarf, and dwarf polyantha varieties.

Awards have been made as follows in these sections :

##### CLIMBING VARIETIES.

###### *Award Class I.*

ALBERTINE (1925),\* raised and sent by Messrs. Barbier, Orleans.

###### *Award Class II.*

AIMÉE VIBERT (1925), raised by M. Vibert, sent by Mr. Frank Cant of Colchester.  
EXCELSA (1925), raised by Mr. Walsh, sent by Messrs. A. Dickson, Newtownards, Co. Down.

CARDINAL WOLSEY (1925), raised and sent by Mr. Leeson, Gretton, Northants.

##### SEMI-DOUBLE AND DOUBLE DWARFS.

###### *Award Class I.*

BETTY UPRICHARD (1924), raised and sent by Messrs. A. Dickson.  
CHRISTINE (1924), raised and sent by Messrs. McGredy, Portadown.  
HAWLMARK CRIMSON (1924), raised and sent by Messrs. A. Dickson.  
INDEPENDENCE DAY (1925), raised and sent by Messrs. Bees, Liverpool.  
JOANNA BRIDGE (1925), raised and sent by Mr. E. J. Hicks, Hurst, Twyford, Berks.

LADY PIRRIE (1925), raised and sent by Messrs. Hugh Dickson, Belfast.  
MADAME BUTTERFLY (1925), raised by Mr. E. J. Hill, and sent by Mr. Thos. Stevenson.

MRS. HENRY BOWLES (1925), raised and sent by Messrs. Chaplin, Waltham Cross.

MRS. HERBERT STEVENS (1925), raised by Mr. McGredy, and sent by Messrs. A. Dickson.

MRS. WEMYSS QUIN (1924), raised and sent by Messrs. A. Dickson.

RED-LETTER DAY (1924), raised and sent by Messrs. A. Dickson.

###### *Award Class II.*

ARIEL (1925), raised and sent by Messrs. Bees.

BEDFORD CRIMSON (1924), raised and sent by Messrs. Laxton, Bedford.

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\* The date following the name is the year in which the Wisley Rose Award was given.



- CHRISSIE MACKELLAR (1924), raised and sent by Messrs. A. Dickson.  
 FRANCES GAUNT (1925), raised and sent by Messrs. A. Dickson.  
 LAMIA (1924), raised and sent by Messrs. Easlea, Leigh-on-Sea, Essex.  
 MADAME JULES BOUCHÉ (1924), raised by Mr. J. Croibier, sent by Messrs. A. Dickson.  
 Miss DOROTHY MOCATTA (1924), raised and sent by Mr. F. Spooner, Horsell, Woking.  
 MRS. BRYCE ALLAN (1924), raised and sent by Messrs. A. Dickson.  
 MRS. C. V. HOWARTH (1924), raised and sent by Messrs. A. Dickson.  
 MRS. HORNBY LEWIS (1924), raised and sent by Mr. E. J. Hicks.  
 SALMON SPRAY (1925), raised by Mr. Grant, sent by Messrs. Hazlewood, Epping, N.S. Wales.  
 SOUVENIR DE CLAUDIUS DENOYEL (1925), raised by M. Pernet-Ducher, sent by Mr. E. J. Hicks.  
 ZEPHYRIN DROUHIN (1925), raised by M. Bizot, sent by Messrs. A. Dickson.

## SINGLE DWARF VARIETIES.

*Award Class I.*

- PINK DELIGHT (1925), raised and sent by Messrs. Laxton.

*Award Class II.*

- ETHEL JAMES (1925), raised and sent by Messrs. McGredy.  
 IRISH ELEGANCE (1925), raised and sent by Messrs. A. Dickson.

## DWARF POLYANTHA VARIETIES.

*Award Class I.*

- CRIMSON ORLEANS (1925), raised and sent by Messrs. Laxton.  
 JOAN OF ARC (1925), raised by M. Levavasseur, sent by Messrs. Cutbush, Barnet.

*Award Class II.*

- CORAL CLUSTER (1925), raised and sent by Messrs. Murrell, Shepperton.  
 EBLOUISSANT (1925), raised and sent by Messrs. Turbat, Orleans.  
 MAUDE E. GLADSTONE (1925), raised and sent by Messrs. Bees.  
 MRS. R. M. FINCH (1925), raised by Mr. R. M. Finch, sent by Mr. Hazlewood.  
 MRS. W. H. CUTBUSH (1924), raised by M. Levavasseur, sent by Messrs. Cutbush.  
 NURSE CAVELL (1924), introduced and sent by Messrs. Cutbush.  
 ORLEANS ROSE (1925), raised by M. Levavasseur, sent by Messrs. Cutbush.  
 YVONNE RABIER (1924), raised by M. Turbat, sent by Messrs. Cutbush.

## NOTES ON ROSES WHICH HAVE OBTAINED THE WISLEY ROSE AWARD OF THE 1ST CLASS.

ALBERTINE was sent to Wisley by the raisers, Messrs. Barbier & Co. of Orleans, in 1923. It proved a vigorous free-flowering climber, though, like other Wichuraiana hybrids, with one period of flowering. The flowers are borne in clusters and are double and of a pleasing almost unique shade of coppery-rose with bright salmon outer petals. The buds are vermilion and the foliage glossy green.

The parentage is Wichuraiana × 'Mrs. Arthur Robert Waddell.'

BETTY UPRICHARD. This fine rose was raised by Messrs. A. Dickson of Newtownards and introduced in 1922, when it first came to Wisley. It is a perfectly hardy variety with erect stems forming a bush about 3 feet high. The smooth deep green foliage is ample and covers the bush well, and, like the young shoot, it is tinged bronze when young. The stems are stout and bear many strong, nearly straight red prickles. The flowers are freely borne in groups of five or six in succession through the year from June until November and are uniformly good. The red buds are fairly long on bristly foot stalks of 4 to 6 inches. The flowers are held erect, are large and double, deep and somewhat flat at the top when open; the general colour is very bright pink and it is lighted with red and salmon-red within; the colour fades somewhat with age but never so much as to look worse than a little less bright. The scent is pleasant but faint. It has had no trace of black spot and the merest trace of mildew. Rather a long time elapses between its successive crops of flowers, but that might perhaps be overcome by pruning to a strong side growth after the first and second crops. It is one of the most satisfactory roses in the trial in every way.

CHRISTINE is a good clear golden yellow rose for bedding, a companion for 'Mrs. Wemyss Quin.' It forms a shapely bush about 2 feet in height, with

glossy foliage resistant to mildew. Its buds are pointed and long, the rather small flowers shapely when open, and keeping their colour well. The flowering is abundant and over a long season and the plant is hardy, much more so than 'Golden Emblem' often appears to be. Both it and 'Mrs. Wemyss Quin' are excellent bedding varieties and both worthy a place where yellow roses are desired. 'Christine' was raised by Mr. McGredy, distributed in 1918, and came to us by the kindness of Messrs. A. Dickson in 1922.

**CRIMSON ORLEANS.** A dwarf polyantha rose about 2 feet in height of excellent habit, like all the sports of 'Orleans' type, with abundant green foliage of medium size. The double flowers are in large clusters of forty or fifty, deep dull red in bud, opening to bright crimson, and keeping their colour well. Except that it is scentless there is little fault to find with this rose, which starts to flower about the end of June and continues until the frosts come. It is brighter than 'Girle,' another sport of 'Orleans,' and does not turn blue in wet weather like 'Nurse Cavell.' It was raised by Messrs. Laxton, who sent it to Wisley in 1922.

**HAWLMARK CRIMSON.** A crimson rose with semi-double flowers, freely produced from June to October, on a hardy, vigorous bush about 3 feet high, with foliage scarcely touched by mildew and carried well into the autumn. The pointed buds are very deep in colour, almost maroon, but open to crimson scarlet. The colour is best when the flowers open in the garden. An excellent garden rose, raised by Messrs. A. Dickson, who sent it to Wisley in 1922, and distributed it in 1920.

**INDEPENDENCE DAY** is an excellent garden rose of habit, making a close bush about 30 inches high, well furnished with moderate-sized glossy green foliage, with a fairly strong "tea" scent, remaining good well into autumn. Its long pointed buds are yellow with a tinge of chrome on the margins of the petals, and are produced in groups of two or three. The flowers are erect, double, and of medium size, with a conical centre when half open, later with semi-erect petals, chrome or deep yellow with a faint tinge of pink, retaining colour well into age. The early flowers (about mid-June) are often poor in shape, but the summer and autumn ones are very pleasing. The flowering is practically continuous till autumn. The perfume is faint unfortunately, otherwise this is an ideal garden rose and suffers little from mildew. It was raised in 1915 by Messrs. Bees of Liverpool, introduced in 1919, and came to Wisley from them in February 1923.

**JOAN OF ARC.** 'Joan of Arc' makes rather less growth than the 'Orleans' type of dwarf Polyantha rose, has rather smaller, paler foliage and smaller groups of flowers which are slightly tinged red in the bud. The small flowers, only about  $1\frac{1}{4}$  inch across, are white with at first a very faint tinge of pink which sometimes becomes intensified at the petal's edge as the flowers age. It was sent to Wisley in 1922 by Messrs. Cutbush. The Polyantha roses, though they commence to flower rather later than the hybrid teas, are so continuous in flowering that they form a very attractive feature in the garden.

**JOANNA BRIDGE.** 'Joanna Bridge' is one of the most vigorous of bush roses, attaining on strong soils more the dimensions of a pillar rose like 'Zephyrin Drouhin,' and on the light soil of Wisley reaching 3 feet 6 inches to 4 feet in its second year. With roses of this type, and indeed with most roses for garden decoration, hard pruning is not called for, and this is a rose essentially for garden decoration, continuous in its flowering but semi-double. The buds are pleasing, the flowers lemon-yellow with a warm tinge, and pleasing when open. It is a variety not so widely grown as it deserves. Raised and distributed by Mr. E. J. Hicks of Hurst, Twyford, Berks, from whom our plants came in 1923.

**LADY PIRRIE.** A variety making bushes 2 feet 6 inches to 3 feet high with stout almost erect stems bearing leathery but dull long lasting deep green foliage carried well into autumn. Flowers borne freely the season through—our notes say flowering freely in November,—and the long pointed buds of perfect form have a beautiful warm chamois tinge, and the large fairly full flowers with petals of good substance are warm pink fading to white or nearly so—the main fault with this excellent garden rose. Raised by Messrs. Hugh Dickson (from whom our plants came in 1922) and distributed in 1910.

**MADAME BUTTERFLY.** 'Ophelia' is a rose so well known that this may be described by comparison with it. It is with us more vigorous, making a stout bush about 2 feet 6 inches in height with abundant deep green foliage. Its flowers are deeper in tone than those of 'Ophelia,' flesh-pink with a warm rose tinge through the whole flower when it opens, fading in the end to nearly white. The buds are of medium length and warm cream before the flower opens. The flowers have some fragrance of the old rose type.

This rose was raised by Mr. Hill in America and was sent to us by Mr. Stevenson in 1922.

MRS. HENRY BOWLES. Another pink rose, best described perhaps as deep rose-pink, the colour deeper outside the petal than within, retaining its colour well. The flowers are fully double and large, of good form, and droop but little on their stems. They have a slight rose scent. The bushes are sturdy and erect in growth, vigorous, and reach about 2 feet in height; the foliage is deep green and well distributed, and the flowering is fairly constant through the season. Messrs. Chaplin raised this variety and sent it to Wisley in 1922.

MRS. HERBERT STEVENS. 'Mrs. Herbert Stevens' is a tea rose but apparently quite hardy, with good foliage and bearing freely white flowers of perfect shape. Its one fault is a tendency to spreading growth, which may be corrected by pulling the branches together in the first year (we are assuming the plants are being grown for garden decoration, not for exhibition flowers, and will not be very severely pruned). The white of the flowers is relieved by an almost imperceptible tinge of colour which gives them a warmth unknown in 'Frau Karl Druschki,' and the flowers are, of course, smaller and of a different shape from that well-known variety. 'Mrs. Herbert Stevens' was raised by Mr. McGredy and distributed in 1910. Our plants came in 1922 from Messrs. A. Dickson.

MRS. WEMYSS QUIN. The bushes of this variety are perhaps a little taller than those of 'Christine,' which is much like it, and the flowers are not quite so deep a yellow as in that variety. As they open a tinge of orange-madder is apparent on the petals, but they become clear yellow with age, except for a little orange or red colouring at the edge of the outer petals. Like 'Christine' this has rather small flowers, but form of flower, vigour and continuous flower production as well as beautiful foliage atone for any shortcoming in this direction, and make the variety a first-class garden rose. It seems to flower at Wisley rather more freely at the end of the season, when the colour of this type of rose is usually at its best, than does 'Christine.' 'Mrs. Wemyss Quin' was raised by Messrs. A. Dickson in 1914, and sent to Wisley by them in 1922.

PINK DELIGHT. 'Pink Delight' is a vigorous rose, making a bush about 3 feet high, continuously in flower from mid-June, free from disease and hardy. The stiff stems are fairly stout and erect, the foliage large, deep green and glossy, and the single flowers in groups of three or five. They are held erect and open in a saucer form about 4 inches across, deep rose pink outside, paler within. A very bright plant if not pruned too severely. Raised by Messrs. Laxton and sent to Wisley in 1922.

RED-LETTER DAY. A decorative rose in the garden with bright scarlet crimson flowers very freely borne throughout the season on good bushes about 2 feet 3 inches in height. The flowers are only semi-double, of rather an irregular shape, retaining their colour well in all weathers, and do not become blue. Messrs. A. Dickson sent this rose out in 1914, and from them it came to Wisley in 1922.

#### LIST OF ROSES IN THE TRIALS IN SUMMER 1925.

The following list shows the Roses at present in the trials at Wisley and serves in a measure to indicate the varieties between which comparisons have been possible. It cannot be too strongly emphasized, however, that many of these varieties have been in the trials too short a time for the Committee to pass an opinion upon them.

In addition to the varieties named there is a considerable number of seedlings growing without names at present, and not yet introduced.

The name in brackets following the varietal name is that of the raiser (or in some cases of the introducer).

ADMIRATION ( <i>McGredy</i> ).	ANGÈLE PERNET ( <i>Pernet-Ducher</i> ).
ADONIS ( <i>Bees</i> ).	ARD'S RAMBLER ( <i>A. Dickson</i> ).
AIMÉE VIBERT ( <i>Vibert</i> ).	ARGYLL ( <i>Dobbie</i> ).
ALBERTINE ( <i>Barbier</i> ).	ARIEL ( <i>Bees</i> ).
ALFRED COOK ( <i>McGredy</i> ).	ARTHUR COOK ( <i>McGredy</i> ).
AMELE DE BETHUNE (?).	ASPIRANT MARCEL ROUYER ( <i>Pernet-Ducher</i> ).
AMERICA ( <i>Hill</i> ).	AUGUSTE FINON ( <i>Turbat</i> ).
AMERICAN PILLAR ( <i>Conrad &amp; Jones</i> ).	AUGUSTUS HARTMANN ( <i>B. Cant</i> ).
AMY HAMMOND ( <i>McGredy</i> ).	

- AUSTRALIA FELIX (*Clark*).  
 AUTOCRAT (*Beckwith*).  
 BABY FAUREX (*Lille*).  
 BABY TAUSENDSCHÖN (?).  
 BARONESS M. VAN TUYLL VAN SEROOS-  
 KERKEN (*Leenders*).  
 BARONESS S. H. W. VAN DEDEM  
 (*Leenders*).  
 BEAUTÉ ORLEANAISE (*Turbat*).  
 BESSIE BROWN (?).  
 BESSIE CHAPLIN (*Chaplin*).  
 BETTY (*A. Dickson*).  
 BETTY HULTON (*A. Dickson*).  
 BETTY UPRICHARD (*A. Dickson*).  
 BEULAH (*F. Cant*).  
 BLACK BOY (*Clark*).  
 BLACK QUEEN (*F. Cant*).  
 BLOSSOM (*Beckwith*).  
 BLUSH RAMBLER (*B. Cant*).  
 BON ACCORD (*Adam & Craigmile*).  
 BORDERER (*Clark*).  
 BRAISWICK CHARM (*F. Cant*).  
 BRAISWICK FAIRY (*F. Cant*).  
 BRAISWICK GEM (*F. Cant*).  
 CANDEUR LYONNAISE (*Crolbier*).  
 CAPITAN GEORGES DESSERIER (*Pernet-  
 Ducher*).  
 CAPT. F. BALD (*A. Dickson*).  
 CAPT. F. S. HARVEY CANT (*F. Cant*).  
 CAPT. KILBEE-STUART (*A. Dickson*).  
 CAPT. RONALD CLARK (*McGredy*).  
 CARDINAL WOLSEY (*Leeson*).  
 CAROLINE TESTOUT (*Pernet-Ducher*).  
 CHAMELÉON (*A. Dickson*).  
 CHARMING (*van Rossem*).  
 CHASTITY (*F. Cant*).  
 CHATILLON RAMBLER (*Nonin*).  
 CHATILLON ROSE (*Nonin*).  
 CHEERFUL (*McGredy*).  
 CHRISSIE MACKELLAR (*A. Dickson*).  
 CHRISTINE (*McGredy*).  
 CHRISTINE PRIOR (*McGredy*).  
 CIRCE (*W. Paul*).  
 CLARICE GOODACRE (*A. Dickson*).  
 CLIMBING:  
   H. V. MACHIN (*H. Dickson*).  
   LADY HILLINGDON (*Hicks*).  
   LYON ROSE (*Ketten*).  
   MME. EDOUARD HERRIOT (*Ketten*).  
   MRS. AARON WARD (*A. Dickson*).  
   MRS. H. STEVENS (?).  
   OPHELIA (*A. Dickson*).  
   TRIOMPHE ORLEANAISE (*Turbat*).  
 COLCESTRIA (*B. Cant*).  
 COLONEL OSWALD FITZGERALD (*A.  
 Dickson*).  
 COLUMBIA (*Hill*).  
 CORAL CLUSTER (*Murrell*).  
 COUNTESS OF ELGIN (*Ferguson*).  
 CRIMSON ORLEANS (*Laxton*).  
 CRUSADER (*Hicks*).  
 CUPID (*B. Cant*).  
 C. V. HOWARTH (*A. Dickson*).  
 DAISY (*Hicks*).  
 DENISE CASSEGRAIN (*La Loire*).  
 DIADÉM (*McGredy*).  
 DR. A. I. PETYT (*Burrell*).  
 DONALD MACDONALD (*A. Dickson*).  
 DORIS TRAYLER (*McGredy*).  
 DOROTHY DIX (*Hicks*).  
 DOROTHY DOUGLAS (*Dobbie*).  
 DOROTHY HOWARTH (*Bees*).  
 DOROTHY MOCATTA (*Spooner*).  
 DOWAGER COUNTESS OF RODEN (*W.  
 Paul*).  
 DUKE OF NORMANDY (*Jersey Nurseries*).  
 EARL HAIG (*A. Dickson*).  
 EBLOUISSANT (*Turbat*).  
 ECHO (*Cutbush*).  
 EDEL (*McGredy*).  
 EDITH CAVELL (*Chaplin*).  
 EDWARD BOHANE (*A. Dickson*).  
 ELDERADO (*Howard & Smith*).  
 ELIZABETH CULLEN (*A. Dickson*).  
 ELLEN POULSEN (*Turbat*).  
 ELSE POULSEN (*Poulsen*).  
 ELSIE BECKWITH (*Beckwith*).  
 EMILY GRAY (*B. Cant*).  
 E. N. WARD (*Kershaw*).  
 ETHEL JAMES (*McGredy*).  
 ETHEL SOMERSET (*A. Dickson*).  
 ÉTIENNE ROUBELLIARD (?).  
 ÉTOILE DE FEU (*Pernet-Ducher*).  
 EUGÈNE BARBIER (*Barbier*).  
 EVA TESCHENDORFF (*Teschendorff*).  
 EVALINE (*Prosser*).  
 EVELYN MURLAND (?).  
 EVRAD KETTEN (*Ketten*).  
 EXCELSA (*Walsh*).  
 FANCY FREE (*Clark*).  
 FIREFLY (*Bees*).  
 FLYING COLOURS (*Hazlewood*).  
 FRAICHEUR (*Turbat*).  
 FRANCES GAUNT (*A. Dickson*).  
 FRANÇOIS JURANVILLE (?).  
 FRANÇOIS MICHELIN (?).  
 FRAU FELIX TONNER (*Leenders*).  
 FRAU KARL DRUSCHKI (*Lambert*).  
 FRED. J. HARRISON (*A. Dickson*).  
 FREDA (?).  
 FRU GERDA HELMUS (*Poulsen*).  
 FRU JOHANNA POULSEN (*Poulsen*).  
 F. W. DUNLOP (*Hicks*).  
 GEISHA (*van Rossem*).  
 GENERAL D. JANSEN (?).  
 GENERAL MCARTHUR (*Hill*).  
 GENERAL SMUTS (*van Rossem*).  
 GEORGE C. WAUD (*Hill*).  
 GEORGE DICKSON (*A. Dickson*).  
 GEORGE ELGER (*Cutbush*).  
 GIPSY (*Evans*).  
 GIRLIE (*Cutbush*).  
 GLADYS HOLLAND (*McGredy*).  
 GLORY OF HURST (*Hicks*).  
 GLOWWORM (*Easley*).  
 GOLDEN EMBLEM (*McGredy*).  
 GOLDEN VISION (*Clark*).  
 GOOILAND (*van Rossem*).  
 GOOILAND BEAUTY (*van Rossem*).  
 GORGEOUS (*H. Dickson*).  
 GRETA KLUIS (*Kluis*).  
 GRETHE POULSEN (*Poulsen*).  
 GULNARE (*Poulsen*).  
 GWEN NASH (*Clark*).  
 GWYNETH (*Woosnam*).  
 GWYNNE CARR (*A. Dickson*).  
 HAWLMARK CRIMSON (*A. Dickson*).  
 HELEN LEENDERS (*Leenders*).

- HENRI BARRUET (*Barbier*).  
 HENRIETTA (*Merryweather*).  
 HENRIETTE TERSTEGG (*van Rossem*).  
 HENRY NEVARD (*F. Cant*).  
 HIAWATHA (*Walsh*).  
 HOLT HEWITT (*Beckwith*).  
 HUGH DICKSON (*H. Dickson*).  
 H. V. MACHIN (*A. Dickson*).  
 HYPATIA (*Bees*).  
 IMPROVED LADY BATTERSEA (*Green*).  
 INDEPENDENCE DAY (*Bees*).  
 INNOCENCE (*Chaplin*).  
 INSULINDE (*van Rossem*).  
 IRENE BRIGHTMAN (*Lane*).  
 IRISH ELEGANCE (*A. Dickson*).  
 IRISH FIREFLAME (*A. Dickson*).  
 ISOBEL (*McGredy*).  
 IVY EVANS (*Evans*).  
 IVY MAY (*Beckwith*).  
 JACOTTE (*Barbier*).  
 JAMES WALLEY (*Easlea*).  
 JANET (*A. Dickson*).  
 JEAN FORESTIER (*Pernet-Ducher*).  
 JERSEY BEDDER (*Le Cornu*).  
 JESSIE (*Levasseur*).  
 JESSIE CLARK (*Clark*).  
 J. G. GLASSFORD (*H. Dickson*).  
 JOAN HOWARD (*Bees*).  
 JOAN OF ARC (*Levasseur*).  
 JOANNA BRIDGE (*Hicks*).  
 JOHN BIENFAIT (*van Rossem*).  
 JOHN HART (*Hicks*).  
 JOHN HENRY (*Beckwith*).  
 JOHN RUSSELL (*Dobbie*).  
 JOSEPH GUY (*Nonin*).  
 JULES TABART (*Barbier*).  
 JULIANA (*Cutbush*).  
 JUNE BOYD (*McGredy*).  
 KAISERIN AUGUSTA VIKTORIA (*Lambert*).  
 KATHLEEN HARROP (*A. Dickson*).  
 KIRSTEN POULSEN (*Poulsen*).  
 KITTY KININMONTH (*Clark*).  
 K. OF K. (*A. Dickson*).  
 KOOTENAY (*A. Dickson*).  
 LA CHAMPAGNE (*Barbier*).  
 LA FRANCE VICTORIEUSE (*Gravereaux*).  
 LA SOMME (*Barbier*).  
 LA TOSCA (*Veuve Schwartz*).  
 LADY ALICE STANLEY (*McGredy*).  
 LADY ASHTOWN (*A. Dickson*).  
 LADY DIXON (*A. Dickson*).  
 LADY ELPHINSTONE (*Dobbie*).  
 LADY GODIVA (*G. Paul*).  
 LADY HILLINGDON (*Lowe & Shawyer*).  
 LADY INCHQUIN (*A. Dickson*).  
 LADY MARTHA BRUCE (*Ferguson*).  
 LADY MAUREN STEWART (*A. Dickson*).  
 LADY PIRRIE (*H. Dickson*).  
 LADY PLYMOUTH (*A. Dickson*).  
 LADY READING (*Hicks*).  
 LADY ROBERTS (*F. Cant*).  
 LADY VENABLES VERNON (*Jersey Nurseries*).  
 LADY VEREY (*Hicks*).  
 LAMIA (*Easlea*).  
 LAXTON'S CHINA RAMBLER (*Laxton*).  
 LE LOIRET (*Turbat*).  
 LESLIE EVANS (*Evans*).  
 LIEUTENANT CHAURÉ (*Pernet-Ducher*).  
 LOCHNAGAR (*Dobbie*).  
 LONETTE CHENAULT (*La Loire*).  
 LORD FAIRFAX (*Beckwith*).  
 LOS ANGELES (*Howard & Smith*).  
 LOUISE C. BRESLAU (*Pernet-Ducher*).  
 LOUISE CRINER (*Chambard*).  
 LUCILE BARKER (*Hicks*).  
 LULU (*Easlea*).  
 LUNA (*Poulsen*).  
 LYON (*Pernet-Ducher*).  
 MA FIANCÉE (*van Rossem*).  
 MABEL JACKSON (*Easlea*).  
 MABEL MORSE (*McGredy*).  
 MADAME ABEL CHATENAY (*Pernet-Ducher*).  
 MADAME A. DREUX (*Souper & Notting*).  
 MADAME BUTTERFLY (*Hill*).  
 MADAME EDMOND GILLET (*Pernet-Ducher*).  
 MADAME EDOUARD HERRIOT PANACHÉE (*La Loire*).  
 MADAME FRANÇOIS GRAINDORGE (*La Loire*).  
 MADAME JULES BOUCHÉ (*Crobier*).  
 MADAME JULES GOUCHAULT (*Turbat*).  
 MADAME LÉON PAIN (*Guillot*).  
 MADAME LOUIS CRETTE (?).  
 MADAME RAVARY (*Pernet-Ducher*).  
 Mlle. LOUIS CRINER (*Chambard*).  
 MAMAN COCHET (*Cochet*).  
 MAMAN TURBAT (*Turbat*).  
 MAMIE (?).  
 MARGARET DICKSON HAMILL (*A. Dickson*).  
 MARIA REID (*Ferguson*).  
 MARIE DOT (*Dot*).  
 MARJORIE BULKELEY (*H. Dickson*).  
 MARY MERRYWEATHER (*Merryweather*).  
 MARY PICKFORD (*Howard & Smith*).  
 MAUD CUMING (*A. Dickson*).  
 MAUDE E. GLADSTONE (*Bees*).  
 MAXIME CORBON (*Barbier*).  
 MELANIE SOUPERT (*Pernet-Ducher*).  
 MELODY (*A. Dickson*).  
 MIDAS (*Murrell*).  
 MILDRED GRANT (*A. Dickson*).  
 MIMI PINSON (*Barbier*).  
 MINNIE SAUNDERS (*Hicks*).  
 MISS DOROTHY MOCATTA (*Spooner*).  
 MISS IDNYAS (?).  
 MISS LOLITA ARMOUR (*Howard & Smith*).  
 MISS MARION MANIFOLD (*Adamson*).  
 MISS WILLMOTT (*McGredy*).  
 MRS. ALFRED TATE (*McGredy*).  
 MRS. ALFRED WEST (*F. Cant*).  
 MRS. AMBROSE RICARDO (*McGredy*).  
 MRS. BECKWITH (*Pernet-Ducher*).  
 MRS. BRYCE ALLAN (*A. Dickson*).  
 MRS. C. E. PEARSON (*McGredy*).  
 MRS. CORNWALLIS WEST (*A. Dickson*).  
 MRS. C. V. HAWORTH (*A. Dickson*).  
 MRS. C. W. DUNBAR-BULLER (*A. Dickson*).  
 MRS. C. W. EDWARDS (*McGredy*).  
 MRS. DELAVAL ASTLEY (*Morse*).  
 MRS. DUNLOP BEST (*Hicks*).

- MRS. FRANK GUTHRIE (*Clark*).  
 MRS. FRANK J. USHER (*Dobbie*).  
 MRS. G. A. WHEATCROFT (*Wheatcroft*).  
 MRS. GEORGE MARRIOTT (*McGredy*).  
 MRS. GEORGE NORWOOD (*Hicks*).  
 MRS. H. BALFOUR (*McGredy*).  
 MRS. H. D. GREENE (*Easlea*).  
 MRS. HENRY BOWLES (*Chaplin*).  
 MRS. HENRY MORSE (*McGredy*).  
 MRS. HERBERT STEVENS (*McGredy*).  
 MRS. HORNBY LEWIS (*Hicks*).  
 MRS. H. TOWNSEND (*Evans*).  
 MRS. JAMES SHEARER (*Ferguson*).  
 MRS. J. HEATH (*McGredy*).  
 MRS. JOHN LAING (*Bennett*).  
 MRS. R. B. MCLENNAN (*Easlea*).  
 MRS. R. D. MCCLURE (*H. Dickson*).  
 MRS. REDFORD (*McGredy*).  
 MRS. R. M. FINCH (*Finch*).  
 MRS. S. K. RINDGE (*Howard & Smith*).  
 MRS. THEODORE SOLVERSEN (*Dobbie*).  
 MRS. TOM SMITH (*Smith*).  
 MRS. WALLIS (*Wallis*).  
 MRS. WEMYSS QUIN (*A. Dickson*).  
 MRS. W. H. CUTBUSH (*Levasseur*).  
 MRS. WILLIAM C. EGAN (*Howard & Smith*).  
 MODESTY (*McGredy*).  
 MOLLY BLIGH (*A. Dickson*).  
 MOLLY SHARMAN CRAWFORD (*A. Dickson*).  
 MONARCH (*Dobbie*).  
 MONTROSE (*Dobbie*).  
 MURIEL WILSON (*Hall*).  
 NANON (*Bernaix*).  
 NICOLAS OF FRESNOY (*Prosser*).  
 NONA (*Easlea*).  
 NORA CUNNINGHAM (*Clark*).  
 NURSE CAVELL (*Cutbush*).  
 OLD GOLD (*McGredy*).  
 OPHELIA (*W. Paul*).  
 ORANGE KING (*Wezelenburg*).  
 ORLEANS ROSE (*Levasseur*).  
 PAPA GOUCHAULT (*Turbat*).  
 PAPA ROUILLARD (*Turbat*).  
 PAUL'S SCARLET CLIMBER (*W. Paul*).  
 PETIT JEAN (?).  
 PHARISAËR (*Himmer*).  
 PINK DELIGHT (*Laxton*).  
 PINK PEARL (*Leenders*).  
 PINK PEARL x LADY HILLINGDON (*Green*).  
 PORTIA (*Bees*).  
 PREMIER (*Hill*).  
 PRESIDENT CHERIOUX (*Pernet-Ducher*).  
 PRESIDENT POINCARÉ (*La Loire*).  
 PRIMROSE PIRRIC (*Dobbie*).  
 PRINCE OF WALES (*Easlea*).  
 PUCK (*Bees*).  
 QUEENIE ROBINSON (*Easlea*).  
 RED AVOCA (?).  
 RED CROSS (*A. Dickson*).  
 RED EXPLORER (*Wezelenburg*).  
 RED-LETTER DAY (*A. Dickson*).  
 REGINA DE ALVEAR (*La Loire*).  
 REIMS (*Barbier*).  
 RENÉE ADORÉE (*Dobbie*).  
 REV. DR. WILLIAMSON (*Pernet-Ducher*).  
 REVEL (*van Rossem*).  
 RICHARD E. WEST (*A. Dickson*).  
 ROBERT CRAIG (*Hooper*).  
 ROMEO (*Easlea*).  
 ROSABEL WALKER (*F. Cant*).  
 ROSE HERA (*van Rossem*).  
 ROSEMARY (*F. Cant*).  
 ROSY MORN (*Clark*).  
 ROUGE ANGEVINE (*Guinoisseau*).  
 ROYAL RED (*Beckwith*).  
 RUBY (*Wezelenburg*).  
 RUDOLF KLUIS (*Kluis*).  
 SALMON SPRAY (*Grant*).  
 SCARLET BEDDER (*Jersey Nurseries*).  
 SHOT SILK (*A. Dickson*).  
 SHOWER OF GOLD (*G. Paul*).  
 SILVERSCENT (*Murrell*).  
 SIMONE LABBÉ (*Ketten*).  
 SNOWFLAKE (*F. Cant*).  
 SOLLIDEN (*Leenders*).  
 SOUVENIR DE CLAUDIUS DENOYEL (*Pernet-Ducher*).  
 SOUVENIR DE CLAUDIUS PERNET (*Pernet-Ducher*).  
 SOUVENIR DE GEORGE BECKWITH (*Pernet-Ducher*).  
 SOUVENIR DE GEORGES PERNET (*Pernet-Ducher*).  
 SOUVENIR DE MME. BOULLET (*Pernet-Ducher*).  
 SOUVENIR DE PAUL GRANDELAUDE (*La Loire*).  
 SOUVENIR DU CAPITAINE FERNAND DE JAPY (*La Loire*).  
 SQUATTER'S DREAM (*Clark*).  
 SUBSTITUT J. CHAPEL (*Bernaix*).  
 SUNBURST (*Pernet-Ducher*).  
 SUNNY SOUTH (*Clark*).  
 SUNSTAR (*A. Dickson*).  
 SUZANNE TURBAT (*Turbat*).  
 SYBIL (*Bees*).  
 SYBIL PEASE (*Evans*).  
 T. F. CROSIER (*Howard & Smith*).  
 THE GARLAND (?).  
 THE QUEEN ALEXANDRA (*McGredy*).  
 TOISON D'OR (*Pernet-Ducher*).  
 ULM SHEEN (?).  
 UNA WALLACE (*McGredy*).  
 VANITY (*Halstead*).  
 VANITY FAIR (*Dobbie*).  
 VENUS (*Bees*).  
 VERDUN (*Barbier*).  
 VESUVIUS (*McGredy*).  
 VICOMTESSE PIERRE DU FOU (*La Loire*).  
 VIOLET PARNCUTT (*Easlea*).  
 VISCOUNTESS DEVONPORT (*Hicks*).  
 VULCAIN (*Turbat*).  
 WALTHAM CRIMSON (*Chaplin*).  
 W. C. GAUNT (*A. Dickson*).  
 W. E. WALLACE (*H. Dickson*).  
 WHITE DOROTHY (*B. Cant*).  
 WHITE ORLEANS (*Hicks*).  
 WILLIAM F. DREER (*Howard & Smith*).  
 YELLOW BEDDER (*van Rossem*).  
 YVONNE (*F. Cant*).  
 YVONNE RABIER (*Turbat*).  
 ZEPHYRINE DROUHIN (*Bizot*).

## PERENNIAL ASTERS AT WISLEY, 1925.

THE trial of Perennial Asters (Michaelmas Daisies) at Wisley in 1925 consisted of 69 varieties which had been growing at Wisley for some years and which in some previous trial had been selected for award, together with 117 varieties raised or put upon the market since the last trial, making 186 varieties in all. The records of the older varieties are contained in our JOURNAL, vol. 46, p. 368, and are not repeated below, the notes given referring entirely to the newer varieties.

Four of the varieties sent in for trial died, and are not further referred to.

The varieties were received in the autumn of 1924 and planted then, being arranged as far as possible according to type and colour. Most made good growth and were in fact somewhat taller than in most years. The heights given may therefore be taken as extremes, and perhaps 6 inches to 9 inches greater than they would attain in normal seasons.

The trial was inspected on several occasions by the Floral Committee, who made recommendations for awards as is shown below.

The dates given in the notes refer to the commencement of effective flowering.

The following, which had gained awards in previous years, were represented in the trials and are described below, but were not regarded by the Judging Committee as of such high standard as those which received an award :

*cordifolius elegans* [A.M. 1902 (R.H.S.)]; 'Snowdrift' [A.M. 1923 (Ballard)]; 'Queen of the Lilacs' [A.M. 1920 (Vicary Gibbs)]; 'Queen of Colwall' [A.M. 1922 (Ballard)]; 'King of the Belgians' [A.M. 1916 (Vicary Gibbs)]; 'Grace Sweet' [A.M. 1920 (Vicary Gibbs)]; 'Little Boy Blue' [A.M. 1922 (Ballard)].

## NOTES AND DESCRIPTIONS.

I. *Amellus* Group.

The varieties of *Aster Amellus* grow to between 1½ and 2½ feet in height, and have rather large greyish-green foliage borne on erect stems which branch from the base. The plants are so sturdy that they require little support. The flowers are few on a stem, but are large and showy and last long, whether on the plant or cut. They may be increased by division, but this is best done in spring, for they resent root disturbance in autumn. They do not grow well in wet soil. They appear to be immune from the aster wilt disease (see JOURNAL, 48, p. 38) and from mildew (see JOURNAL, 42, p. 22).

*Aster Amellus* is a native of Middle and Southern Europe and Western Asia, growing usually in rather dry, sunny places. We have put *A. Thomsonii* into this group, since in many ways it resembles

*A. Amellus*, though the flowers are usually rather thinner. *A. Thomsonii* seems rarely to ripen seed, and it may be because of this that its flowering season from July to October is so prolonged. Two or three seedlings have recently been put upon the market and are represented in the trial by *A. Robinsonii* and *A. Frikartii*.

## AWARDS.

**Ideal**, A.M. September 28, 1925. Sent by Messrs. Ruys.

**Ruby**, A.M. September 28, 1925. Raised and sent by Messrs. Bones of Cheshunt.

**Robinsonii**, A.M. September 28, 1925. Raised and sent by Messrs. Dickson & Robinson of Manchester.

**Frikartii**, A.M. August 31, 1925. Sent by Messrs. Ruys.

**Superbus**, A.M. October 15, 1925. Sent by Messrs. Barr, King St., Covent Garden, W.C. 2.

**Perle Rose**, H.C. September 28, 1925. Sent by Messrs. Barr.

*Flowers pink.*

**FRIQUET** (Ruys). The plants sent under this name were mixed, and the taller darker one was recommended for an award; the other was dwarfier and had nearly white flowers. Some doubt exists regarding the plant to which this name actually belongs and the Award is therefore suspended until the name is settled. Both add a new colour tone to this section.

**GENERAL PERSHING** (Jones).—2 feet; flowers 2 inches; pale bright bluish-pink; disc golden. September 30.

*Flowers pink and mauve.*

**LA FRANCE** (Ruys).—2 feet; flowers  $2\frac{1}{2}$  to 3 inches; pale pinkish-mauve; disc golden. September 18.

**PERLE ROSE** (Barr), H.C.—2 feet; flowers  $1\frac{3}{4}$  to 2 inches; pale pinkish-mauve; disc golden. September 15.

**IDEAL** (Ruys), A.M.— $2\frac{1}{2}$  feet; flowers 2 to  $2\frac{1}{2}$  inches; bright rosy-mauve; disc golden. September 15.

**RUBY** (Bones), A.M.—Habit very compact;  $2\frac{1}{4}$  feet; flowers  $1\frac{1}{2}$  inch; of a darker shade than 'Ideal'; disc golden-brown. September 15.

**MISS A. E. GROLL** (Ruys).— $2\frac{1}{2}$  feet; flowers  $1\frac{1}{2}$  inch; bright rosy-mauve, of a darker shade than 'Ruby'; disc golden-brown. October 16.

*Flowers lavender-blue.*

**ROBINSONII** (Dickson & Robinson), A.M.—2 feet; flowers 2 to  $2\frac{1}{4}$  inches; pale blue tinged lavender; disc golden-yellow. August 15. (Thomsonii seedling).

**FRIKARTII** (Ruys), A.M.—3 feet; flowers  $2\frac{1}{4}$  to  $2\frac{1}{2}$  inches; of a darker shade than 'Robinsonii'; disc golden-yellow. This is the larger counterpart of 'Thomsonii.' August 13. The raiser of this variety, M. Frikart, claims that it is a cross between *A. Thomsonii* and *A. Amellus*, and several forms have been selected out and named, and are now at Wisley. This form, the only one in the trial, was named on the Continent *A. Frikartii* 'Glory of Stafa.'

**VIOLA** (Jones).—2 feet; flowers 2 to  $2\frac{1}{2}$  inches; blue somewhat tinged lavender; disc golden-yellow. September 25.

**SUPERBUS** (Barr), A.M.— $2\frac{1}{4}$  feet; flowers 2 to  $2\frac{1}{4}$  inches; blue tinged lavender; disc golden. September 18.

**FRAMFIELDII** (Barr).—2 feet; flowers  $1\frac{3}{8}$  inch; lavender-blue; disc golden-brown. October 8.

**PREZIOSA** (Barr).— $2\frac{1}{2}$  feet; flowers  $1\frac{1}{2}$  to  $1\frac{3}{4}$  inch; blue tinged lavender, of a darker shade than 'Framfieldii'; disc golden. September 16.

2. *Ericoides Group.*

The varieties which we have placed in this group grow from 2 to  $3\frac{1}{2}$  feet in height. The plants are very bushy, branching from the base, and have very small leaves borne on long arching stems, along which are arranged very numerous small flowers on short branches. The



best way to stake the plants which belong to this group of Asters is to place pea-sticks among them early in their development, and allow the stems to grow through them. *A. ericoides* hails from North America, where it is to be found growing in dry, open places. We have placed *A. vimineus* here, for it much resembles *A. ericoides* in many ways, but when found growing wild it prefers shade, and soil of a swampy nature. The other species in this group are *A. diffusus* and *A. cordifolius*, which are of a somewhat looser habit and have larger flowers than *A. ericoides*; *A. gracillimus* is of more erect growth than the others and has a great drawback in that its flowers, which open white, are quickly stained bluish.

#### AWARDS.

Doris, A.M. October 15, 1925. Raised and sent by Messrs. Dickson & Robinson.

Twilight, A.M. October 15, 1925. Raised by Mr. Beckett and sent by Messrs. Jones of Lewisham, S.E.

#### Flowers white.

MIGNONETTE (Dickson & Robinson).—2½ feet; flowers  $\frac{3}{8}$  inch; white; disc pale yellow becoming bluish. October 1.

DORIS (Dickson & Robinson), A.M.—3½ feet; flowers  $\frac{5}{8}$  inch; white; disc pale lemon-yellow. September 25.

ALPHA (Dickson & Robinson).—3½ feet; flowers  $\frac{1}{2}$  inch; white; disc pale yellow becoming reddish-blue. August 28.

DIFFUSUS HORIZONTALIS (Barr).—3 feet; flowers  $\frac{7}{8}$  inch; white; petals reflexed; disc reddish. October 8. (*A. diffusus*).

GRACILLIMUS (Barr).—4 feet; habit erect; flowers  $\frac{7}{8}$  inch; white becoming bluish-pink quickly; disc yellow. October 10.

#### Flowers cream.

BRIMSTONE (Dickson & Robinson).—3 feet; flowers  $\frac{3}{8}$  inch; cream; disc bright yellow. September 23.

#### Flowers of pink shades.

ESTHER (Barr).—3½ feet; flowers  $\frac{1}{16}$  inch; pale blush-pink; disc pale yellow. September 30.

AUTUMN ROSE (Dickson & Robinson).—5 feet; flowers  $\frac{9}{16}$  to 1 inch; pale rose-pink; disc pale yellow. September 24. (*ericoides* × *cordifolius*).

MILKY WAY (Barr).—3½ feet; flowers 1 to  $1\frac{1}{16}$  inch; of a darker shade than 'Autumn Rose.' October 1.

BETH (Dickson & Robinson).—3 feet; flowers  $\frac{1}{2}$  inch; of a darker and somewhat bluer shade than 'Autumn Rose.' September 29.

ROSY (Dickson & Robinson).—3½ feet; flowers  $\frac{1}{2}$  inch; rose; disc pale yellow. September 30.

#### Flowers lavender.

PROGRESS (Dickson & Robinson).—4 feet; flowers  $\frac{1}{2}$  to  $\frac{3}{4}$  inch; very pale bluish-lavender; disc pale yellow. August 26.

TWILIGHT (Jones), A.M.—3 feet; flowers  $\frac{3}{8}$  inch; pale silvery-lavender; disc pale yellow. October 1.

CORDIFOLIUS ELEGANS (Barr).—4 feet; flowers  $\frac{1}{16}$  inch; pale pinkish-lavender; disc creamy-yellow. September 30.

### 3. *Novi-Belgii* Group.

The varieties of *A. Novi-Belgii* grow from 2 to 6½ feet in height; they have large smooth foliage on stout erect stems, which are much branched above the middle. The flowers are borne in more or less flat-topped heads, as in 'October Dawn,' or singly, on

short branches which spring from the whole of the upper half of the stem, as in 'Climax.' The best results are obtained, especially with the more vigorous growing varieties, when each clump is replanted every year and each plant grown with one or two main stems, each of which should be firmly tied to a stout stake. *A. Novi-Belgii* is a native of North America, whence it was introduced into England in 1710. In its native habitat it is usually found growing in open spaces, but nevertheless it is partial to moisture. This species sets seeds readily, and perhaps this is the reason why this group is represented by more varieties than any other, there being 78 out of the 117 varieties sent in for trial. *A. Novi-Belgii* appears to cross readily with other species, especially *A. cordifolius*; an example of this is represented in the present trial, the variety being 'Pioneer.' *A. Novi-Belgii* is very prone to aster wilt disease, and it is also much affected by mildew.

*Flowers white.*

AWARDS.

**Queen Elizabeth, A.M.** October 15, 1925. Raised and sent by Messrs. Ballard of Colwall.

**Paper White, H.C.** October 15, 1925. Raised and sent by Messrs. Kelway of Langport.

**WHITE BUTTON** (Ballard).—3½ feet; habit very compact; flowers 1¼ to 1½ inch; semi-double, white; disc yellow. September 24.

**QUEEN ELIZABETH** (Ballard), A.M.—4½ feet; flowers 2 inches; semi-double, white; rays somewhat quilled; disc yellow. September 25.

**SNOWDRIFT** (Ballard, Jones).—4½ feet; flowers 1½ inch; semi-double, white, stains bluish quickly; disc pale yellow. September 15. Much mildew.

**JONES' WHITE** (Jones).—4½ feet; flowers 1¼ to 1½ inch; single, white, later tinged blue; disc yellow. September 24.

**SAM BANHAM** (Barr).—5½ feet; flowers 2 inches; single, white, later tinged lilac; disc yellow. October 1. Somewhat running.

**PAPER WHITE** (Kelway), H.C.—5½ feet; inflorescence pyramidal; flowers 1½ inch; single, white with a very slight lavender tinge; disc pale yellow. October 1.

**WORLINGTON WHITE** (Hinchcliff).—5½ feet; flowers 1½ inch; white; disc pale yellow. September 25. Runs very badly.

**SILVER STAR** (Stokes).—5½ feet; flowers 1½ inch; greyish-white; disc pale yellow. September 16. Inclined to run.

*Flowers of pink shades.*

AWARDS.

**Margaret Ballard, A.M.** September 28, 1925. Raised and sent by Messrs. Ballard.

**Aldenham Pink, A.M.** October 15, 1925. Raised by Mr. Beckett and sent by Messrs. Beckett, Jones (A.M. 1923).

**BEE'S BLUSH** (Jones).—4 feet; flowers 1½ to 2 inches; somewhat ragged, single, pale blush-pink; disc yellow. September 15. Running.

**COUNTRESS** (Ballard).—4 feet; flowers 2 inches; semi-double, somewhat ragged, pale rose-pink; disc pale yellow. September 17.

**PIONEER** (Ballard).—4 feet; habit compact; flowers 1½ inch; single, pale rose-pink; disc deep-yellow. September 18. (*Novi-Belgii* × *cordifolius*.)

**BIJOU** (Jones).—4 feet; flowers 1¼ inch; single, pale rose-pink; disc yellow. September 28.

**PINK PERFECTION** (Beckett).—4½ feet; flowers 1¼ inch; single, bright rose-pink; disc yellow. September 30. A little mildew.

**ROSE QUEEN** (Ruys).—3 feet; flowers 2 inches, double, bright rose-pink; much mildew. September 15.

**PINK PYRAMID** (Beckett, Jones).—3½ feet; habit somewhat spreading; flowers 1½ inch; single, bright rose-pink; disc yellow. September 25.

MARGARET BALLARD (Ballard), A.M.—3½ feet; flowers 1½ to 2 inches; semi-double, bright rose-pink; very free flowering; disc yellow. September 22.

MERMAID (Beckett).—4½ feet; flowers 1½ inch; single, bright rose; disc yellow. Mildews somewhat. September 17.

ALDENHAM PINK (Beckett, Jones), A.M.—4½ feet; flowers 1½ inch; single, of a deeper shade than 'Mermaid'; disc yellow. October 1.

*Flowers pinkish-mauve.*

AWARDS.

Little Pink Lady, A.M. October 15, 1925. Raised and sent by Messrs. Ballard.

Maid of Athens, A.M. September 28, 1925. Raised and sent by Messrs. Ballard. (A.M. 1924.)

Semi-Plenus, A.M. October 15, 1925. Raised by Mr. Beckett and sent by Messrs. Jones.

Delicata, H.C. October 15, 1925. Raised by Mr. Beckett and sent by Messrs. Jones.

Northern Glory, H.C. October 15, 1925. Raised and sent by Messrs. Dickson & Robinson.

ROSE PROFUSION (Dickson & Robinson).—5½ feet; habit spreading; flowers 1½ inch; single, very pale pinkish-mauve; disc pale yellow. September 29.

MOTHER-OF-PEARL (Ballard).—4 feet; flowers 2 to 2½ inches; single, very pale pink tinged lavender; disc yellow; much mildew. September 28.

HEIDROSE (Jones).—5 feet; flowers 1½ to 1¾ inch; single, of a somewhat darker shade than 'Mother-of-Pearl.' September 30.

CALLIOPE (Dickson & Robinson).—4 feet; habit very compact; flowers 1½ to 1¾ inch; single, pale pinkish-mauve; disc yellow. September 25.

ROSY MORN (Ballard).—4 feet; flowers 1¾ to 1½ inch; single, of a somewhat pinker shade than 'Heidrose' and a shade darker than 'Calliope.' A little mildew. September 23.

LITTLE PINK LADY (Ballard), A.M.—2 feet; habit very compact; flowers 1½ inch; pale pinkish-mauve; disc yellow. October 3.

MAID OF ATHENS (Ballard), A.M.—5 feet; flowers 2 inches; semi-double, pale rose and pinkish-mauve; disc yellow; much mildew. September 25.

GERALDINE KELWAY (Kelway).—4½ feet; flowers 1½ inch; cup-shaped, single, pale pink tinged lavender; rays quilled; disc deep yellow; very much mildew. September 20.

NORTHERN GEM (Dickson & Robinson).—4 feet; flowers 1½ to 1¾ inch; single, pale pinkish-lavender; disc pale yellow. September 25.

DELICATA (Jones), H.C.—5 feet; flowers 1¾ inch; single, pale pink tinged lavender; disc yellow. October 1.

HARMONY (Jones).—4½ feet; flowers 1½ to 1¾ inch; single, pale pinkish-mauve; disc pale yellow. Much mildew. October 4.

POWDER-PUFF (Ballard).—3 feet; flowers 1¾ inch; semi-double, pale pinkish-mauve; disc pale yellow. September 17.

ERATO (Dickson & Robinson).—3 feet; habit very compact; flowers 1 inch; single, pinkish-mauve; rays very narrow; disc yellow. September 25.

FASCINATION (Beckett).—6½ feet; inflorescence pyramidal; flowers 1¾ inch; cup-shaped, pinkish-mauve; disc yellow; inclined to run. October 11.

MAUVE BEAUTY (Beckett, Jones).—4½ feet; habit very compact; flowers 1¾ inch; single, pinkish-mauve; disc pale yellow. October 11. Mildew slight.

NORTHERN GLORY (Dickson & Robinson), H.C.—3 feet; habit very compact; flowers 1¾ inch; single, bright pinkish-mauve; disc yellow; little mildew. October 1.

RED STAR (Dickson & Robinson).—5 feet; flowers 1½ inch; single, bright pinkish-mauve; disc pale yellow; much mildew. September 17.

ROI DES ASTERS (Ruys).—3 feet; flowers 1½ inch; single, pale rosy-mauve; disc yellow. September 17.

SEMI-PLenus (Jones), A.M.—4½ feet; flowers 1½ inch; single, bright rosy-mauve; disc yellow. October 10.

WALKDEN'S PINK (Dickson & Robinson).—4½ feet; flowers regular, 1½ inch; bright rosy-mauve; disc golden; much mildew. September 16.

*Flowers mauve.*

AWARDS.

Nora Rogers, A.M. October 15, 1925. Sent by Messrs. Jones, Barr.

Maggie Perry, H.C. September 28, 1925. Raised by Messrs. Perry and sent by Messrs. Jones (A.M. 1920).

DON (Barr).— $5\frac{1}{2}$  feet; habit somewhat spreading; flowers  $1\frac{1}{2}$  inch; pale mauve; disc yellow; inclined to run. October 5.

AI (Bones).— $6\frac{1}{2}$  feet; flowers  $1\frac{3}{8}$  inch; of a somewhat bluer shade than 'Don.' Much mildew. October 4.

NORA ROGERS (Jones, Barr), A.M.— $4\frac{1}{2}$  feet; habit very compact; flowers  $1\frac{3}{4}$  to 2 inches; bright mauve; tips of petals recurved; disc yellow; inclined to run. October 2.

DEFIANCE (Sadler).—6 feet; flowers  $1\frac{3}{8}$  inch; pale lavender-mauve; disc yellow. October 11.

MAGGIE PERRY (Jones), H.C.— $3\frac{3}{4}$  feet; flowers 2 to  $2\frac{1}{2}$  inches; pale lavender-mauve, fades somewhat; disc pale yellow. September 18.

#### *Flowers lilac.*

DUCHESS (Ballard).—4 feet; flowers  $1\frac{3}{4}$  to 2 inches; pale blush-lilac; tips of petals incurved; disc pale yellow. September 23.

EARLY (Varian).— $3\frac{1}{2}$  feet; flowers  $1\frac{1}{2}$  inch; very pale lilac; disc yellow. September 18.

QUEEN OF THE LILACS (Beckett).— $4\frac{1}{2}$  feet; habit spreading; flowers  $1\frac{1}{2}$  inch; cup-shaped, pale lilac; disc yellow. September 29.

FRINGED (Varian).— $3\frac{1}{2}$  feet; habit spreading; flowers  $1\frac{1}{2}$  inch; pale lilac; tips of rays notched; disc yellow. September 18.

BLUE CLOUD (Varian).— $3\frac{1}{2}$  feet; habit spreading; flowers  $1\frac{1}{4}$  inch; pale lilac; disc pale yellow; inclined to run at the base. September 24.

#### *Flowers lavender.*

##### AWARDS.

Queen Mary, A.M. October 15, 1925. Raised and sent by Mr. Beckett.

Mrs. Pierpont Morgan, H.C. October 15, 1925. Raised and sent by Mr. Beckett (A.M. 1924).

GRAND COURONNE (Cox).— $6\frac{1}{2}$  feet; habit spreading; flowers  $1\frac{1}{2}$  to  $1\frac{3}{8}$  inch; pale lavender-grey; disc pale yellow; running at the base. October 4.

MRS. PIERPONT MORGAN (Beckett), H.C.— $6\frac{1}{2}$  feet; flowers  $1\frac{1}{4}$  inch, pale lavender-grey; disc pale yellow. October 4.

PHYLLIS (Bones).— $4\frac{1}{2}$  feet; flowers  $1\frac{1}{16}$  inch; pale lavender-grey; disc golden; inclined to run. September 16.

GREY LADY (Ballard, Jones).—4 feet; habit somewhat spreading; flowers 2 to  $2\frac{1}{2}$  inches; pale silvery-lavender; disc yellow; running. September 18.

MODESTY (Beckett).— $5\frac{1}{4}$  feet; flowers  $1\frac{1}{2}$  to  $1\frac{1}{8}$  inch; single, pale bright lavender; disc pale yellow; inclined to run. October 12.

LAVENDER BELLE (Jones).— $5\frac{1}{2}$  feet; habit somewhat spreading; flowers  $1\frac{1}{2}$  to  $1\frac{1}{8}$  inch; pale lavender; disc pale yellow; liable to mildew. October 6.

EDWIN BECKETT (Barr).—5 feet; flowers  $1\frac{1}{4}$  inch; pale lavender, single; disc pale yellow. September 25.

FRAMFIELD GEM (Bones).—5 feet; flowers flat,  $1\frac{1}{8}$  inch; single, pale lavender; disc yellow. October 7.

QUEEN MARY (Beckett), A.M.— $5\frac{1}{2}$  feet; habit somewhat spreading; flowers single, 2 inches, lavender; disc pale yellow. October 8.

QUEEN OF COLWALL (Ballard, Jones).—5 feet; habit compact; flowers 2 to  $2\frac{1}{2}$  inches; lavender, single; rays narrow, twisted; disc pale yellow; much mildew. September 25.

LAVENDER (Ballard).—4 feet; flowers  $1\frac{1}{2}$  to  $1\frac{7}{8}$  inch; semi-double, bright lavender; disc yellow; inclined to run; a little mildew. August 28.

#### *Flower pale blue.*

##### AWARDS.

Freedom, A.M. September 28, 1925. Raised and sent by Messrs. Ballard.

Acme, A.M. October 15, 1925. Raised by Mr. Beckett, and sent by Messrs. Beckett, Jones.

October Dawn, A.M. October 15, 1925. Raised and sent by Messrs. Ballard (A.M. 1923).

Wedgwood, H.C. October 15, 1925. Raised and sent by Mr. Beckett.

CHEZ NOUS STAR (Cox).— $5\frac{1}{2}$  feet; flowers  $1\frac{3}{4}$  inch; pale lavender-blue, single; rays narrow, twisted; disc golden-yellow. September 18.

RENOWN (Jones).— $5\frac{1}{2}$  feet; flowers  $1\frac{3}{8}$  inch; single, pale lavender-blue; disc golden-yellow; inclined to run. September 18.

KING OF THE BELGIANS (Kelway, Barr).—5½ feet; habit spreading; flowers 1¾ to 1½ inch; single, pale lavender-blue; disc yellow; running badly. September 22.

FREEDOM (Ballard), A.M.—4½ feet; habit compact; flowers 1¾ inch; single, bluish-lavender; disc yellow. September 18.

MISS EISELE (Ruys).—3½ feet; flowers 2 to 2½ inches; somewhat ragged, single, pale blue tinged lavender; disc yellow; inclined to run. September 23.

BLUEBELL (Dickson & Robinson).—3¾ feet; habit very compact; flowers 1½ inch; single, pale blue tinged lavender; disc yellow; inclined to run. September 25.

BLUE SPIRE (Dickson & Robinson).—5 feet; flowers 1¾ inch; single, much like 'Bluebell' in colour; spike pyramidal; inclined to run. October 4.

SAPPHIRE (Jones).—4¾ feet; flowers 1½ to 1¾ inch; single, pale blue tinged lavender; tips of rays incurved; disc yellow; inclined to run. September 29.

WEDGWOOD (Beckett), H.C.—3¾ feet; flowers 1½ inch; single, somewhat cup-shaped, pale blue tinged lavender; tips of rays somewhat incurved; disc yellow. September 25.

PORCELAIN (Jones, Beckett).—4½ feet; flowers 1½ inch; single, of a darker shade than 'Sapphire.' September 29.

ACME (Beckett, Jones), A.M.—6½ feet; habit somewhat spreading; flowers single, 2 inches; pale blue tinged lavender; tips of rays recurved; disc yellow. October 8.

ECLIPSE (Beckett, Jones).—5 feet; flowers 1½ to 1¾ inch; pale blue tinged lavender, single; disc yellow. October 8.

OCTOBER DAWN (Ballard), A.M.—3½ feet; habit very compact; flowers 2½ to 2½ inches; bright lavender-blue, single; disc yellow. October 1.

NORTHERN AZURE (Dickson & Robinson).—4½ feet; flowers single, 1¾ inch; deep lavender-blue; disc yellow; mildew. October 1.

*Flowers dark blue.*

#### AWARDS.

Royal Blue, A.M. September 28, 1925. Raised and sent by Mr. Ballard (A.M. 1924).

Purple Robe, H.C. October 15, 1925. Raised by Mr. Beckett and sent by Messrs. Jones.

REV. CHARLES NUNN (Barr).—4 feet; flowers single, 1½ inch; deep lavender-blue; disc yellow; inclined to run. September 15.

GRACE SWEET (Beckett)—4½ feet; flowers semi-double, 1¾ to 1½ inch; blue tinged lilac; disc yellow; inclined to run. September 25.

PURPLE ROBE (Jones), H.C.—4 feet; habit compact; flowers 1¾ to 1½ inch; single, pale blue-purple; rays very narrow; disc yellow. October 1.

PURPLE EMPEROR (Ballard).—4 feet; flowers single, 1¾ inch; pale purplish-lavender; disc yellow. September 24.

LITTLE BOY BLUE (Ballard).—3 feet (taller than normal); habit very compact; flowers 1½ to 1½ inch; regular, bright deep blue; disc yellow. September 20.

ROYAL BLUE (Ballard), A.M.—4 feet; habit compact; flowers cup-shaped; semi-double, 1½ to 1¾ inch; bright royal-blue; disc golden. September 15.

#### 4. *Novae-Angliae* Group.

The varieties of *A. Novae-Angliae* are taller than most of those of the preceding groups, their heights varying from 4½ to 6½ feet. They are of erect growth, and resemble *A. Novi-Belgii* in many ways; their foliage is of a greyer shade and more or less hairy; their flowers are borne in flat-topped heads which are not so clear of the foliage as in *A. Novi-Belgii*, and moreover often when cut (with the exception of 'Barr's Pink') they close up quickly. They appear to be free from the aster wilt disease and are little affected by mildew. *A. Novae-Angliae* is a native of North America, whence it was introduced into England in 1710. A variety of this species, *A. ruber*, was introduced in 1812 from America. Only seven varieties of this species were sent in for trial.

*Flowers rose-pink.*

## AWARD.

**Barr's Pink**, A.M. September 28, 1925. Raised and sent by Messrs. Barr (A.M. 1922).

**NORTHERN QUEEN** (Dickson & Robinson).—4½ feet; flowers single, 1⅝ to 1¾ inch; rose-pink; disc reddish-brown. September 18.

**BARR'S PINK** (Barr), A.M.—5½ feet; flowers semi-double, 2 to 2½ inches; rose-pink; tips of rays somewhat incurved; disc golden-yellow. September 22.

**NORTHERN RED** (Dickson & Robinson).—5 feet; flowers single, 1⅝ inch; bright rich rose; disc reddish-brown. September 18.

*Flowers rosy-cerise.*

## AWARD.

**Crimson Beauty**, A.M. October 15, 1925. Raised and sent by Messrs. Barr.

**CRIMSON BEAUTY** (Barr), A.M.—4¾ feet; flowers single, 1½ inch; rich rosy-cerise, base darker; disc golden-brown. September 27.

*Flowers of purple shades.*

**NORTHERN GIANT** (Dickson & Robinson).—5½ feet; flowers single, 1¾ inch; pale rosy-purple; disc reddish-brown. September 20.

**THORPE HALL** (Barr).—6 feet; flowers 1½ to 1¾ inch; rich purplish-blue, single; disc reddish-brown. October 6.

**STORMCLOUD** (Barr).—5½ feet; flowers single, 1⅝ inch; of a darker and redder shade than 'Thorpe Hall.' September 30.

## SWEET PEAS AT WISLEY, 1921-25.

For the past five years trials of Sweet Peas have been made at Wisley in order to provide an opportunity for Fellows to see the present-day varieties growing in the garden, and the Floral Committee to judge of their distinctness and relative value for garden cultivation.

During this time over six hundred stocks of Sweet Peas have been grown and judged, and while many were duplicates (both with similar and dissimilar names) very many distinct varieties were represented.

Reference to the annual records of the trials in the JOURNALS for the past four years will show that the varieties grown include practically all those now in cultivation. But few varieties of the 'Cupid' type have been grown, and in this series none of the winter-flowering type; but in addition to the ordinary varieties a good many of the "early-flowering" type, which has found considerable favour in America, were included, and on the whole they cannot be said to have been of any great value, for their eagerness to flower militates against growth and also against long duration.

It may be of value to give here lists of varieties which have been selected for award in these trials. In the following lists the varieties which have received Awards of Merit are grouped according to the colour as seen in the mass in the garden, and reference to the page in the JOURNAL at which the variety is described will give information upon other characteristics.

## VARIETIES GAINING AWARD OF MERIT.

## WHITE VARIETIES.

KING WHITE, 1924. J. K. King, Coggeshall. See JOUR. R.H.S., 50, p. 112.  
 MASCOTTS WHITE, 1924. Ireland & Hitchcock, Marks Tey. See JOUR. R.H.S., 50, p. 112.

EDNA MAY IMPROVED, 1924. Ireland & Hitchcock. See JOUR. R.H.S., 50, p. 112.

[N.B.—Only very minor characters distinguish the foregoing three varieties.]

JOAN RYDER, 1924. Ryder, St. Albans. See JOUR. R.H.S., 50, p. 113.

CONSTANCE HINTON, 1924. A. Dickson, Newtownards; Dobbie, Edinburgh;

W. J. Unwin, Histon. See JOUR. R.H.S., 50, p. 113.

[These two varieties, though distinct, have the same general effect in the garden.]

## CREAM.

CREAM CONSTANCE HINTON, 1924. Dr. Hinton, Heytesbury. See JOUR. R.H.S., 50, p. 113.

HAWLMARK CREAM, 1924. A. Dickson. See JOUR. R.H.S., 50, p. 113.

MATCHLESS, 1924. Dobbie, Ireland & Hitchcock. See JOUR. R.H.S., 50, p. 113.

MAJESTIC CREAM, 1924. Unwin. See JOUR. R.H.S., 50, p. 113.

[These three are for all practical purposes alike.]

PARADISE IVORY, 1924. Kelway. See JOUR. R.H.S., 50, p. 113.

## WHITE, EDGED PALE PINK.

ANNIE IRELAND. A. Dickson } 1923. See JOUR. R.H.S., 49, p. 71.  
 ELSIE. Dobbie }

[These are indistinguishable.]

CREAM, EDGED PALE PINK.

RYBURGH LEMON PICOTEE, 1923. G. Stark, Ryburgh. See JOUR. R.H.S., 49, p. 72.

PALE PINK VARIETIES—WHITE GROUND.

MRS. H. RICHARDS, 1923. Unwin. See JOUR. R.H.S., 49, p. 72.

HEBE, 1922. J. Stevenson, Wimborne. See JOUR. R.H.S., 48, p. 108.

HAWLMARK SALMON PINK, 1922. A. Dickson; Cullen, Witham. See JOUR. R.H.S., 48, p. 109.

CREAM GROUND.

While still pale pink, these have quite a different tone from the white ground varieties.

FAIR LADY, 1922. J. Stevenson. See JOUR. R.H.S., 48, p. 110.

PICTURE, 1922. Dobbie. See JOUR. R.H.S., 48, p. 110.

CERISE—WHITE GROUND.

ROYAL CHERRY, 1922. H. Dickson; Cullen. See JOUR. R.H.S., 48, p. 111.

CREAM GROUND.

CHARMING, 1923. J. Stevenson. See JOUR. R.H.S., 49, p. 76.

ROYAL SALUTE, 1925. King. See JOUR. R.H.S., 49, p. 76.

ROSE OR SALMON-CERISE—CREAM GROUND.

WILD ROSE, 1923. J. Stevenson. See JOUR. R.H.S., 49, p. 73.

DORIS, 1922. Dobbie; King; Webb of Stourbridge. See JOUR. R.H.S., 48, p. 112.

ROSY-CARMINE ON WHITE GROUND.

COTTAGE ROSE, 1922. E. W. Birtles, Frodsham. See JOUR. R.H.S., 48, p. 112.

ON CREAM GROUND.

JOHN INGMAN, 1923. Barr, Covent Garden. See JOUR. R.H.S., 49, p. 73.

PINK BICOLOR.

BUTTERFLY SPENCER, 1923. G. Stark. See JOUR. R.H.S., 49, p. 73.

ORANGE-SALMON.

BUNTY, 1923. Ireland & Hitchcock. See JOUR. R.H.S., 49, p. 74.

GEORGE SHAWYER, 1923. Dobbie. See JOUR. R.H.S., 49, p. 74.

ILLUMINATION, 1923. Burpee, Philadelphia. See JOUR. R.H.S., 49, p. 74.

DONALD McNAUGHTON, 1923. Elliott, Illinois. See JOUR. R.H.S., 49, p. 74.

LIBERTY, 1923. J. Stevenson. See JOUR. R.H.S., 49, p. 75.

ORANGE-SCARLET.

THOMAS STEVENSON IMPROVED, 1923. Morse, San Francisco. See JOUR. R.H.S., 49, p. 76.

MAY UNWIN, 1923. Unwin. See JOUR. R.H.S., 49, p. 76.

[These two are nearly alike.]

PIMPERNEL, 1923. King. See JOUR. R.H.S., 49, p. 75.

GLORIOSA, 1923. Dobbie. See JOUR. R.H.S., 49, p. 75.

SCARLET.

HAWLMARK SCARLET, 1923. Cullen. See JOUR. R.H.S., 49, p. 77.

MASCOTTS SCARLET, 1923. Veitch; Barr; Holmes. See JOUR. R.H.S., 49, p. 77.

MRS. C. P. TOMLIN, 1923. Nutting. See JOUR. R.H.S., 49, p. 77.

THE CARDINAL, 1923. Veitch, Exeter. See JOUR. R.H.S., 49, p. 77.

[These four are similar to one another.]

CRIMSON.

SUNPROOF CRIMSON, 1924. Dobbie; Kelway, Langport. See JOUR. R.H.S., 50, p. 114.

MAUD HOLMES, 1924. Barr. See JOUR. R.H.S., 50, p. 114.

[These two are alike.]



- CHARITY, 1924. J. Stevenson; King; Unwin; Veitch; Ireland & Hitchcock; Barr. See JOUR. R.H.S., 50, p. 114.  
 UNWIN'S CRIMSON, 1924. Unwin. See JOUR. R.H.S., 50, p. 114.  
 [These two are almost alike.]  
 CRIMSON KING, 1924. Morse; Dobbie; Webb. See JOUR. R.H.S., 50, p. 114.

## BLUE BICOLOR.

- VICTORY, 1921. Bees. See JOUR. R.H.S., 47, p. 77.  
 DISTINCTION (sent as FANCY), 1921. Ireland & Hitchcock. See JOUR. R.H.S., 47, p. 77.  
 [These two are indistinguishable.]  
 MAGIC, 1921. Bees. See JOUR. R.H.S., 47, p. 78.  
 AFTERGLOW, 1921. Barr. See JOUR. R.H.S., 47, p. 78.

## LAVENDER.

- HAWLMARK LAVENDER, 1921. A. Dickson. See JOUR. R.H.S., 47, p. 75.

## PALE BLUE.

- MRS. TOM JONES, 1921. A. Dickson; Barr. See JOUR. R.H.S., 47, p. 76.

## ROSY LAVENDER.

- GLADYS, 1921. King. See JOUR. R.H.S., 47, p. 77.  
 R. F. FELTON, 1921. Webb; Bolton; Barr; Bees; Dobbie. See JOUR. R.H.S., 47, p. 77.  
 AUSTIN FREDERICK IMPROVED, 1921. Woodcock. See JOUR. R.H.S., 47, p. 77.  
 [These two are practically identical.]

## MAUVE.

- BROCADE, 1921. Veitch. See JOUR. R.H.S., 47, p. 78.  
 BERTRAND DEAL IMPROVED, 1921. Barr. See JOUR. R.H.S., 47, p. 78.  
 SHAMROCK, 1921. Ireland & Hitchcock. See JOUR. R.H.S., 47, p. 78.

## DARK BLUE.

- COMMANDER GODSALL, 1921. Webb. See JOUR. R.H.S., 47, p. 79.

## PURPLE.

- ROYAL PURPLE, 1921. Ireland & Hitchcock. See JOUR. R.H.S., 47, p. 79.

## MAROON.

- MAROON KING, 1924. Woodcock. See JOUR. R.H.S., 50, p. 114.  
 NUBIAN, 1924. Kelway. See JOUR. R.H.S., 50, p. 114.  
 WARRIOR, 1924. Dobbie; Unwin; A. Dickson; W. H. Simpson, Birmingham; King; Webb; Ireland & Hitchcock. See JOUR. R.H.S., 50, p. 114.  
 [These three are too much alike.]

In some former reports we drew attention to the method of cultivation which has been successfully followed, and which we commend to those who have insufficient accommodation to winter the plants in frames and who do not wish to grow especially for exhibition.

The soil was deeply dug, the top spit remaining in its original position. The digging was done all over the plot equally deep, for we doubt the general wisdom of merely deeply digging a trench. Partially decayed garden refuse was thoroughly incorporated during the digging and a surface dressing of wood ashes was given about the time of planting. No other manure was used. This cultivation was done during late autumn.

The seeds were sown at the beginning of March singly in "60" pots, and the seedlings were kept in cold frames until about mid-April, when they were planted out, with as little root disturbance as possible, in clumps. Each clump measured 5 feet across and contained twenty-seven plants equally spaced, and about 4 feet separated one clump

from the next. Small twiggy sticks were put among the plants as soon as they were planted, to act as shelter from wind and to assist in supporting the plants as they began to climb, and tall pea-sticks reaching about 8 feet out of the ground were later given to support the growth. These sticks were eventually entirely hidden and the clumps were a mass of flower. All early flowers were picked off as soon as seen and before they opened until about mid-June. This enabled the plants to make good growth and lengthened the eventual flowering season. All dying flowers were picked off in order to prevent seed formation.

In 1925 the varieties which had been selected for awards were grown, and one was then raised from Highly Commended to Award of Merit. This was 'Royal Salute' (see above). A few new seedlings were also grown, and special mention may be made of 'Mauve Beauty,' which was Highly Commended, and which is of an unusually deep, clear mauve for a sweet pea, paler in colour than 'Royal Purple.'





FIG. 39 —ANNUAL SCABIOUS.

[To face p. 113.]

## ANNUAL SCABIOUS AT WISLEY, 1924.

ANNUALS are used in gardens far less than they deserve to be, possibly because there is nearly always a feeling of impermanence about them, but probably also because they do not receive the attention necessary for their proper development. Too often they are overcrowded, with the result that they become drawn, fail to branch, produce few flowers, and are soon past. On the other hand, if they are given plenty of room to develop in moderately good soil, especially when it is deeply dug, large, copiously branched plants are produced which in due course flower profusely and (especially if seed formation is prevented) continue in flower over a very long period.

There is a long list of annuals worth their place in gardens, and among them the Sweet Scabious is one of the best, for its colours are various and pleasing, it is of excellent habit, hardy, and sweet scented, and its flowers have long, stiff stalks, making it excellent for cutting and, since the flowers travel well and last six or seven days after cutting, good as a market flower. The cultivation is simple. Deeply dug, moderately rich, well-drained soil suits them best. They may be sown where they are to flower or raised like Asters and planted out. For the purposes of this trial the seed was sown on March 17 in pots, and the seedlings were pricked off singly into "large 60" pots at the end of that month (instead of into boxes subsequently to be potted into these pots, as is often done). Careful watering is necessary always, but especially where this method of dealing with seedlings is practised. If this care is exercised, however, the result repays. Less labour is required, time is saved, and the plants are ready to plant out with very little disturbance of their roots. They were planted in their flowering quarters on land where Wallflowers had flowered, in the third week in May. The plants were put in twelve inches apart in the rows and fifteen inches between the rows, and they well covered the ground. Twiggy sticks and later light stakes were put among them to support them as they grew in case of heavy wind, and this attention too was worth while. They began to flower about the last week in July and continued until frost stopped further development.

The annual Scabious is known in a large number of varieties "single" and "double," of varying colours and heights, all derived from *Scabiosa atropurpurea*, a native of South-west Europe, whence it is said to have been introduced in 1629. Its common name, "Sweet Scabious," is given in allusion to its fragrance, and a name now almost unknown except in books, "Mournful Widow," was given in allusion to its frequent use in Portugal and other countries in the making of wreaths.

The following notes show the chief variations to which it gives

rise and the awards made by the Council on the recommendation of the Floral Committee, who, after seeing the plants on several occasions, made their recommendations on August 20.

## AWARDS, DESCRIPTIONS AND NOTES.

### I. Habit Dwarf (up to 18 inches).

#### AWARDS.

**Dwarf Rosy-Lilac, H.C.** August 20, 1924. Sent by Messrs. Nutting of Southwark Street, S.E.

**Dwarf Blue, H.C.** August 20, 1924. Sent by Messrs. Nutting.

**Peter Pan, H.C.** August 20, 1924. Introduced and sent by Messrs. R. Veitch of Exeter.

**Dwarf Reddish-Black, H.C.** August 20, 1924. Sent by Messrs. Nutting.

#### 1. Flowers white.

**SNOWDRIFT (R. Veitch).**—Plant 12 to 15 inches tall, compact; stems 5 to 7 inches long; flowers  $1\frac{1}{2}$  inch diameter, dull white. Flowering from July 28. Introduced by sender.

**DWARF WHITE (Nutting).**—Characters as 'Snowdrift.' Contained rose-pink rogue.

\* \* \*

**TOM THUMB WHITE (Barr).**—Characters as 'Snowdrift,' but of dwarfer and more compact habit. Flowering from August 2.

#### 2. Flowers rose.

**TOM THUMB ROSE (Barr).**—Plant 12 to 15 inches tall, compact; stems 4 to 6 inches long; flowers 2 inches diameter, pale rosolane-purple. Flowering from August 3. Mixed with taller and mauve rogues.

#### 3. Flowers mauve.

**TOM THUMB DARK LILAC (Barr).**—Plant 12 inches tall, compact; stems 9 inches long; flowers 2 inches diameter, mauve. Flowering from August 2. Mixed with taller and rosy-lilac rogues.

\* \* \*

**DWARF ROSY-LILAC (Nutting), H.C.**—Plant 16 inches tall, compact; stems 9 inches long; flowers 2 inches diameter, bright rosy-lilac. Flowering from August 2. Stock not quite true.

\* \* \*

**DWARF BLUE (Nutting), H.C.**—Plant 16 to 18 inches tall, compact; stems 9 inches long; flowers 2 inches diameter, pale lavender-mauve; buds white. Flowering from August 11. Stock not quite true.

#### 4. Flowers red.

**TOM THUMB BRICK RED (Barr).**—Flowers bright spinel-red. A very mixed stock in height and colour.

#### 5. Flowers crimson-carmine.

**TOM THUMB FIERY CRIMSON (Barr).**—Plant 16 inches tall, compact; stems 4 inches long; flowers 2 inches diameter, bright crimson-carmine. Flowering from July 30. A mixed stock.

\* \* \*

**PETER PAN (R. Veitch), H.C.**—Plant 16 inches tall, compact; stems 8 inches long; flowers  $1\frac{1}{4}$  inch diameter, bright deep crimson-carmine. Flowering from August 2. Stock not quite true.

**DWARF PURPLE (Nutting).**—A less good stock of 'Peter Pan.'

#### 6. Flowers crimson-maroon.

**DWARF REDDISH-BLACK (Nutting), H.C.**—Plant 16 inches tall, compact; stems 9 inches long; flowers  $1\frac{1}{4}$  inch diameter, deep crimson-maroon. Flowering from August 2

\* \* \*

**TOM THUMB DARK PURPLE (Barr).**—Characters as 'Dwarf Reddish-Black,' but flowers of a paler shade and stems shorter. Irregular in height and colour.

II. *Habit Intermediate* (over 18 inches and less than 30 inches).

## AWARDS.

Rose Queen, Azure Queen, Cerise Queen, Crimson Queen, Purple Queen, The Sultan,	} H.C. August 20, 1924. Sent by Messrs. A. Dickson of Newtownards, co. Down.
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1. *Flowers dull white.*

WHITE QUEEN (A. Dickson).—Plant 2 feet tall, rather loose; stems 12 inches long; flowers 2 inches diameter. Flowering from July 31. Stock not quite true.

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HAWLMARK WHITE (A. Dickson).—Plant 18 to 24 inches tall, compact; stems 6 to 14 inches long; flowers  $2\frac{1}{2}$  to  $2\frac{1}{2}$  inches diameter. Flowering from August 18. Contained taller and dark-budded rogues.

2. *Flowers rose-pink.*

ENCHANTRESS (A. Dickson).—Plant 2 feet, compact; stems 7 to 12 inches long; flowers 2 inches diameter, bright pale rose-pink. Flowering from July 29. Contained mauve and paler rogues.

\*       \*       \*

ROSE QUEEN (A. Dickson), H.C.—Characters as 'Enchantress,' but flowers of a darker shade.

3. *Flowers lilac.*

DOUBLE LILAC (Kelway).—Plant 30 inches, compact; stems 12 inches long; flowers 2 inches diameter, bright lilac; buds white. Flowering from August 2. Variable in shade.

\*       \*       \*

LILAC QUEEN (A. Dickson).—Characters as 'Double Lilac,' but flowers bright deep lilac. Contained maroon-mauve and dark-budded rogues.

4. *Flowers mauve.*

AZURE QUEEN (A. Dickson), H.C.—Plant  $2\frac{1}{2}$  feet, compact; stems 14 inches long; flowers  $2\frac{1}{2}$  inches diameter, pale lavender-mauve; buds white. Flowering from July 28. Stock not quite true.

\*       \*       \*

HAWLMARK MAUVE (A. Dickson).—Plant  $1\frac{1}{2}$  to 2 feet, rather spreading; stems 9 inches long; flowers  $2\frac{1}{2}$  inches diameter, pale rosy-lilac. Flowering from August 18. Contained taller growing rogues.

5. *Flowers magenta-purple.*

CERISE QUEEN (A. Dickson), H.C.—Plant 28 inches tall, compact; stems 9 to 14 inches long; flowers 2 inches diameter, bright magenta-purple. Flowering from July 30. Variable in shade.

6. *Flowers red.*

CARDINAL (A. Dickson).—Characters as 'Cerise Queen,' but flowers pale bright spinel-red. A mixed stock.

7. *Flowers crimson.*

BLOOD-RED (A. Dickson).—Character as 'Cerise Queen,' but flowers bright blood-red. Very variable in shade.

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CRIMSON QUEEN (A. Dickson), H.C.—Characters as 'Cerise Queen,' but flowers bright deep crimson-carmine, becoming purplish.

8. *Flowers crimson-maroon.*

HAWLMARK PURPLE (A. Dickson).—Plant 16 to 24 inches tall, rather spreading; stems 9 inches long; flowers  $2\frac{1}{2}$  inches diameter, deep crimson-maroon. Flowering from August 16. Contained taller, cream and rosy-mauve rogues.

\*       \*       \*

PURPLE QUEEN (A. Dickson), H.C.—Plant  $2\frac{1}{2}$  feet tall, compact; stems 11 inches long; flowers 2 inches diameter, deep crimson-maroon. Flowering from July 30.

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THE SULTAN (A. Dickson), H.C.—Characters as 'Purple Queen,' but flowers a deeper shade. Stock not quite true.

## III. Habit Tall (over 3 feet).

## AWARDS.

Snowball, A.M. August 20, 1924. Raised by Messrs. Watkins & Simpson, and sent by Messrs. R. Veitch and Daehnfeldt of Odense, Denmark.

Bright Crimson, A.M. August 20, 1924. Sent by Messrs. W. H. Simpson of Birmingham.

Black King, A.M. August 20, 1924. Sent by Messrs. Barr of King Street, Covent Garden, W.C.

{ Azure Fairy, A.M. August 20, 1924. Sent by Messrs. Dobbie of Edinburgh.

{ Fairy, H.C. August 20, 1924. Sent by Messrs. Barr.

{ Azure Fairy, H.C. August 20, 1924. Sent by Messrs. Daehnfeldt.

Flesh Pink, H.C. August 20, 1924. Sent by Messrs. Waller Seed Co. of Guadalupe, California.

Treasure, H.C. August 20, 1924. Raised by Messrs. Watkins & Simpson and sent by Messrs. R. Veitch.

Fire King, H.C. August 20, 1924. Raised and sent by Messrs. Watkins & Simpson.

Crimson and White, H.C. August 20, 1924. Sent by Messrs. Dobbie.

Pompadour,

Large Flowered Black, } H.C. August 20, 1924; { Sent by Messrs. Dobbie.

Bedding Strain Improved, H.C. August 20, 1924. Sent by Messrs. Barr. { Sent by Messrs. Carter.

1. *Flowers white.*

SNOWBALL (R. Veitch, Daehnfeldt), A.M.—Plant 3½ feet; stems 18 to 24 inches long; flowers 2½ inches diameter, almost round, dull white; buds white. Flowering from August 14.

SNOWBALL (Barr, Heinemann).—Characters as last, but less good stocks. The first contained dark-budded rogues.

\* \* \*

TALL WHITE (Nutting).—Plant 3½ feet, rather spreading; stems 1½ to 2 feet long; flowers 2½ inches diameter, flat round, dull white. Flowering from August 14.

WHITE (Dobbie).—Characters as 'Tall White' but contained mauve and dark-budded rogues.

MAMMOTH WHITE (A. Dickson).—Characters as 'Tall White,' but contained 50 per cent. dark-budded rogues.

LARGE FLOWERED WHITE (J. Carter).—Characters as 'Tall White,' but contained lilac and dark-budded rogues.

WHITE (Waller Seed Co.).—Characters as 'Tall White.' A true stock.

2. *Flowers yellow.*

YELLOW PRINCE (Barr).—Plant 3 feet tall, rather spreading; stems 12 to 15 inches long; flowers 1½ to 2 inches diameter, dull creamy-yellow. Flowering from August 11. Contained white and purple rogues.

MAMMOTH YELLOW (A. Dickson).—Characters as 'Yellow Prince.' Stock mixed.

YELLOW (Dobbie).—Characters as 'Yellow Prince.' Contained white-flowered rogues.

GOLDEN WEST (R. Veitch).—Characters as 'Yellow Prince,' but contained white rogues.

SULPHUR YELLOW (Waller Seed Co.).—Characters as 'Yellow Prince.' A true stock.

3. *Flowers of pink shades.*

FLESH PINK (Waller Seed Co.), H.C.—Plant 3 feet; stems 18 to 24 inches long; flowers 2½ inches diameter, centre florets white tinged rose, outer paler. Flowering from August 12.

\* \* \*

LARGE FLOWERED FLESH (Carter).—Characters as 'Flesh Pink,' but flowers of a somewhat darker shade. Stock not true.

MAMMOTH FLESH PINK (A. Dickson).—Characters as 'Large Flowered Flesh.' Contained mauve rogues.

CORAL PINK (Barr).—Characters as 'Large Flowered Flesh.' Contained maroon rogues.

\* \* \*

LIGHT PINK (W. H. Simpson).—A mixed stock.



4. *Flowers of rose shades.*

TALL DEEP ROSE (Nutting).—Plant 3 feet; rather spreading; stems 16 to 18 inches long; flowers 2½ inches diameter, bright rose. Flowering from August 18. Stock not true.

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MAMMOTH ROSE (A. Dickson).—Characters as 'Tall Deep Rose,' but plant 3½ feet tall; flowers bright deep rose. Flowering from August 8. Stock not true.

ROSE (Daehnfeldt, Waller Seed Co.).—Characters as 'Mammoth Rose.' Stocks not true.

\*       \*       \*

ROSE QUEEN (R. Veitch).—A mixed stock.

5. *Flowers lavender and mauve.*

FAIRY (Heinemann).—Plant 3½ feet tall, rather spreading; stems 18 to 24 inches long; flowers 2½ inches diameter, lavender; buds whitish. Flowering from August 14. Contained dark-budded rogues.

AZURE FAIRY (Waller Seed Co.).—Characters as 'Fairy.'

\*       \*       \*

AZURE FAIRY (Dobbie), A.M.—Characters as 'Fairy,' but flowers lavender-mauve. Flowering from August 12.

AZURE FAIRY (Daehnfeldt), H.C.—Similar to 'Azure Fairy.' A less good stock.

AZURE FAIRY (Carter, W. H. Simpson, Watkins & Simpson, R. Veitch).—Similar to 'Azure Fairy' but less good stocks. Contained dark-budded rogues.

FAIRY (Barr), H.C.—Similar to 'Azure Fairy,' but contained a dark-budded rogue.

\*       \*       \*

SKYLARK (R. Veitch).—Characters as 'Azure Fairy,' but plants 3½ feet tall and flowers deep mauve. Contained dark-budded rogues.

AGERATUM BLUE (Waller Seed Co.).—Characters as 'Skylark.'

6. *Flowers rosy-lilac.*

MAMMOTH LILAC (A. Dickson).—Plant 3½ feet, rather spreading; stems 18 to 24 inches long; flowers 2½ inches diameter, rosy-lilac. Flowering from August 8. Contained maroon rogues.

\*       \*       \*

TALL MAUVE (Nutting).—Plant 3 feet, rather spreading; stems 18 inches long; flowers 2 inches diameter, rosy-mauve. Flowering from August 20.

MAUVE QUEEN (R. Veitch).—Similar to 'Tall Mauve.'

7. *Flowers of carmine shades.*

CARMINE (Dobbie).—Plant 3 feet tall; stems 18 inches long; flowers 2½ inches diameter, dull carmine. Flowering from August 14. Variable in shade.

\*       \*       \*

TALL REDDISH PURPLE (Nutting).—Characters as 'Carmine,' but flowers 2 inches diameter, dull carmine-red. Flowering from August 18.

\*       \*       \*

DOUBLE BRICK RED (Kelway).—Plant 3½ feet tall; stems 18 to 20 inches long; flowers 2½ inches diameter, bright reddish-carmine; fades. Flowering from August 12. Contained maroon rogues.

\*       \*       \*

FIERY SCARLET (Daehnfeldt).—Characters as 'Double Brick Red,' but flowers of a darker shade. Variable in shade.

GLORIOSA (A. Dickson).—Similar to 'Fiery Scarlet,' but contained maroon rogues.

FIRE KING (Barr).—Similar to 'Fiery Scarlet.' Variable in shade and contained rosy-mauve rogues.

CHARITY (A. Dickson).—Too much like 'Fiery Scarlet.' Contained maroon and mauve rogues.

\*       \*       \*

FIRE KING (Watkins & Simpson), H.C.—Plant 3 feet tall, rather spreading; stems 18 to 24 inches long; flowers 2½ inches diameter, bright reddish-carmine becoming dull purplish-carmine. Flowering from August 14.

BRIGHT CRIMSON (W. H. Simpson), A.M.—Characters as 'Fire King,' but flowers of a darker shade. A good true stock.

TREASURE (R. Veitch), H.C.—Characters as 'Bright Crimson.' Stock not quite true.

LARGE FLOWERED FIERY SCARLET (Carter).—Characters as 'Bright Crimson.'

CRIMSON (Kelway, Waller Seed Co.).—Characters as 'Bright Crimson.' The first contained salmon rogue.

\* \* \*

CHERRY RED (Dobbie).—Characters as 'Bright Crimson,' but flowers bright deep crimson-carmine, becoming purplish-carmine. Flowering from August 8. Stock not quite true.

\* \* \*

CHERRY RIPE (A. Dickson).—Characters as 'Bright Crimson,' but flowers bright purplish-carmine, becoming dull as flower fully opens. Contained salmon rogue.

LARGE FLOWERED CHERRY RED (Carter).—Similar to 'Cherry Ripe.' Variable in shade.

### 8. *Flowers purplish-crimson edged white.*

CRIMSON AND WHITE (Dobbie), H.C.—Plant  $3\frac{1}{2}$  feet tall; stems 18 to 24 inches long; flowers  $2\frac{1}{2}$  inches diameter, bright purplish-crimson broadly edged with white. Flowering from August 14.

\* \* \*

MAROON AND WHITE (Dobbie).—Too much like 'Crimson and White.' Contained white and lilac rogues.

VIOLET AND WHITE (Nutting).—Too much like 'Crimson and White.' Contained maroon rogues.

### 9. *Flowers crimson-maroon.*

BLACK KING (Barr), A.M.—Plant  $3\frac{1}{2}$  feet tall; stems 18 to 24 inches long; flowers  $2\frac{1}{2}$  inches diameter, deep crimson-maroon. Flowering from August 14.

BLACK PRINCE (Daehnfeldt, Dobbie).—Similar to 'Black King.' The last contained white-edged rogues.

KING OF THE BLACKS (Waller Seed Co.).—Similar to 'Black King.'

\* \* \*

POMPADOUR (Dobbie), H.C.—Plant  $3\frac{1}{2}$  feet tall, rather spreading; stems 18 to 24 inches long; flowers  $2\frac{1}{2}$  inches diameter, deep crimson-maroon, a darker shade than 'Black King.' Flowering from August 10.

LARGE FLOWERED BLACK (Carter).—Similar to 'Pompadour.'

GLORY OF DEVON (R. Veitch).—A mixed stock.

\* \* \*

ROYAL PURPLE (A. Dickson).—Characters as 'Pompadour,' but flowers very deep crimson-maroon. Contained salmon and lilac rogues.

### 10. *Flowers various.*

BEDDING STRAIN IMPROVED (Barr), H.C.—A very good strain.

\* \* \*

SINGLE LARGE FLOWERED MIXED (Barr).—Double flowered.

LARGE FLOWERED MIXED (Carter).—Of mixed colours.

\* \* \*

CORAL RED (Barr).—Flowers mixed colours, mostly maroon shades.

## HELIANTHEMUMS AT WISLEY, 1924-25.

EIGHTY-ONE named forms and eighteen unnamed seedling rock-roses were planted in this trial in November 1923. They were put out in sandy soil in long beds for easy comparison, the different colours being grouped as far as possible. Almost all made good growth, and they were inspected on several occasions by the Floral Committee, who made recommendations for awards in June 1924 and in June 1925.

*Helianthemum* are well named, for they are pre-eminently plants of the sun, and except in bright sun their flowers scarcely open at all. The genus is a large one, and many species are not hardy, but a few, including those native in Britain, will survive most winters in our gardens. They are best accommodated by a sloping or a rocky bank facing the sun, and the soil should be well drained, but, given this, heavy, light, sandy, and chalky soils alike suit them. They flower about the end of May, and in June profusely (though the individual flowers last but a day), and intermittently afterwards. They should be cut back after flowering, and will then better keep tidy and withstand hard weather.

Several species were represented in the trial, viz. the almost herbaceous *Helianthemum Tuberaria* from Southern Europe, and the following shrubby species: *H. alpestre*, from the mountains of Central Europe, the Caucasus and Asia Minor; *H. umbellatum*, from Southern Europe and Northern Africa; *H. oelandicum*, from Southern Europe; *H. lunulatum*, from the Piedmontese Alps; *H. algarvense*, from Spain and Portugal; and many forms and hybrids of the three closely allied species, *H. apenninum* (*H. polifolium*), *H. vulgare* (*H. Chamaecistus*) (both British), and *H. glaucum*, from Southern Europe. The majority of the garden forms belong to this last group of species, and it is almost vain to attempt to assign many of them to one or the other.

The dates given refer to the effective flowering time.

## AWARDS, DESCRIPTIONS, AND NOTES.

## A. Single Varieties.

*Flowers white.*

## AWARDS.

**The Bride, A.M.** June 10, 1924. Sent by Messrs. Wood of Ashtead.

**H. umbellatum, C.** June 10, 1924. From the R.H.S.

**SNOWDRIFT (Bakers).**—Foliage dark green; flowers  $1\frac{1}{2}$  inch diameter, somewhat cup-shaped, white, base orange. May 28.

**THE BRIDE (Wood), A.M.**—Foliage grey-green; flowers  $1\frac{1}{2}$  inch diameter, flattish, held erect, white, base yellow. May 21.

**WISLEY WHITE (R.H.S.)**—Foliage medium grey-green; flowers  $1\frac{3}{16}$  inch diameter, flat, held erect, white, base picric-yellow; margins of petals wavy. May 18.

**WATERGATE WHITE (Christy).**—Foliage grey-green; flowers  $1\frac{1}{8}$  inch diameter; white, centre lemon-yellow. June 10.

*H. UMBELLATUM* (R.H.S.), C.—Habit erect, shrubby; foliage dark green; flowers  $\frac{3}{8}$  inch diameter, cup-shaped, in whorls, pure white, base tinged pale golden-yellow. May 21.

*Flowers yellow.*

#### AWARDS.

*H. alpestre* (Canary), A.M. June 2, 1925. From the R.H.S. St. John's College Yellow, A.M. June 2, 1925. Introduced and sent by Mr. W. M. Christy. (C. 1924.)

*Wisley Primrose*, H.C. June 10, 1924. Sent by Messrs. Notcutt of Woodbridge. *Starlight*, C. June 11, 1925. Raised by Mr. Nicoll and sent by Mr. W. M. Christy.

*Goldie*, C. June 10, 1924. Raised and sent by Mr. Christy.

*H. lunulatum*, C. June 11, 1925. Sent by Messrs. Backhouse, York, and Messrs. Notcutt.

*H. oelandicum* (R.H.S.).—Foliage dark green; flowers 1 inch diameter, bright clear lemon-yellow. June 7.

*WINDERMERE* (R.H.S.).—Foliage dark green; flowers  $1\frac{3}{10}$  inch diameter, primrose, base yellow with two irregular narrow orange bands. June 2. Also sent by Messrs. Wood as '*H. lunulatum*' in error.

*ELLA* (Morris).—Characters as '*Windermere*.'

*STARLIGHT* (Christy), C.—Foliage dark green; flowers  $1\frac{1}{2}$  inch diameter, pale creamy-primrose, base darker; margins of petals recurved. May 29.

*WISLEY PRIMROSE* (Notcutt), H.C.—Foliage medium green; flowers  $1\frac{1}{2}$  inch diameter, flat, held erect, bright pale primrose; base darker. June 6.

*H. ALPESTRE* (CANARY) (R.H.S.), A.M.—Habit very compact; foliage small, dark green; flowers borne in axils of leaves,  $\frac{3}{8}$  inch diameter, pale golden-yellow. May 28. This came to us under the name '*Canary*' originally, but is the true wild species.

*H. VULGARE* (R.H.S.).—Foliage dark green; flowers  $1\frac{9}{10}$  inch diameter, pale clear lemon-yellow. May 28.

*H. TUBERARIA* (Bakers).—Habit very compact; foliage large, medium green; flowers 1 inch diameter, bright lemon-yellow. July 2.

*GOLDCREST* (R.H.S.).—Foliage dark green, young tips yellowish; flowers  $1\frac{1}{2}$  inch diameter, bright golden-yellow. June 3.

*H. TOMENTOSUM* (Wood).—Foliage grey-green; flowers  $1\frac{1}{2}$  inch diameter, bright golden-yellow. June 4.

*GOLDEN QUEEN* (Hemsley).—Foliage bright dark green; flowers  $1\frac{1}{2}$  inch diameter, bright golden-yellow; darker than foregoing. May 28.

*ST. JOHN'S COLLEGE YELLOW* (Christy), A.M.—Foliage medium grey-green; flowers held erect,  $1\frac{1}{2}$  inch diameter, very bright golden-yellow with orange blotch at base. May 21.

*GOLDIE* (Christy), C.—Foliage dark green; flowers held erect,  $1\frac{1}{8}$  inch diameter, deep golden-yellow. June 7.

*H. LUNULATUM* (Backhouse, Notcutt), C.—Habit very compact; foliage medium green; flowers  $\frac{3}{8}$  inch diameter, golden-yellow with a red spot at the base of each petal. June 6.

*H. ALGARVENSE* (Notcutt).—Habit shrubby, erect, compact; foliage grey-green; flowers  $1\frac{1}{3}$  inch diameter, lemon-yellow with a deep brownish-maroon zone at base. June 6.

*Flowers orange-yellow.*

#### AWARDS.

*Ben Nevis*, A.M. June 10, 1924. Raised and sent by Mr. Nicoll of Monifieth. *Sensation*, C. June 2, 1925. Raised and sent by Mr. Hemsley of Crawley.

*BEN NEVIS* (Nicoll), A.M.—Habit very compact; foliage dark green; flowers  $1\frac{3}{10}$  inch diameter, held erect, bright orange-yellow with a bronzy-crimson zone at base. June 6.

*SENSATION* (Hemsley), C.—Foliage dark green; flowers 1 inch diameter, deep golden-yellow, centre pale orange-scarlet, held erect. June 3.

*Bronzy-orange.*

#### AWARDS.

<b>Fireball</b> <b>Rubens</b> <b>Bronze King</b>	} A.M. June 11, 1925	{ From the R.H.S. { Sent by Messrs. Hemsley. { Raised and sent by Messrs. Backhouse.
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Chocolate Blotch, A.M. June 2, 1925. Sent by Mr. Christy.  
 Afflick, H.C. June 10, 1924. Introduced and sent by Mr. Christy.  
 Orange, H.C. June 10, 1924. Raised and sent by Mr. Christy.  
 Somerville's Copper, H.C. June 10, 1924. Introduced and sent by Mr. Christy.

FIREBALL (R.H.S.), A.M.—Foliage dark green; flowers  $1\frac{3}{8}$  inch diameter, bright bronzy-orange, base orange, held erect. June 3.

RUBENS (Hemsley), A.M.—Characters as 'Fireball.' June 2.

BRONZE KING (Backhouse), A.M.—Characters as 'Fireball.' June 4.

BEN MORE (Nicoll).—Foliage dark green; flowers  $1\frac{3}{8}$  inch diameter, bright rich orange; petals recurved. June 4.

BEN LAWERS (Nicoll).—Foliage green; flowers  $1\frac{1}{2}$  to  $1\frac{1}{8}$  inch diameter, bright bronzy-orange, centre deep orange; margins of petals curled. May 27.

AFFLICK (Christy), H.C.—Foliage dark bright green; flowers  $1\frac{1}{2}$  inch diameter, bright deep bronzy-orange, with bronzy-copper zone at base. June 6.

ORANGE (Christy), H.C.—Foliage grey-green; flowers  $1\frac{1}{8}$  inch diameter, ochreous-orange, centre brownish-orange. May 21.

SOMERVILLE'S COPPER (Christy), H.C.—Foliage dark green; flowers  $1\frac{1}{2}$  inch diameter, deep copper, centre bronzy-crimson, held erect. June 4.

CHOCOLATE BLOTCH (Christy), A.M.—Foliage grey-green; flowers  $1\frac{3}{8}$  inch diameter, deep copper, centre bright crimson. June 2.

*Apricot.*

AWARDS.

Apricot, A.M. June 10, 1924. Raised by Mr. Nicoll and sent by Mr. Christy.

Aurantiacum } H.C. June 10, 1924 { Sent by Messrs. Bakers of Codsall.  
 Brilliant } Sent by Messrs. Wood.

APRICOT (Christy), A.M.—Foliage dark green; flowers  $1\frac{1}{10}$  inch diameter, creamy-apricot, centre deep orange; fades somewhat. June 7.

CHAPMANII (Morris).—Foliage dark green; flowers  $1\frac{1}{2}$  inch diameter, pale apricot-buff, centre orange; weak grower. June 28.

AURANTIAUM (Bakers), H.C.—Foliage grey-green; flowers  $1\frac{1}{2}$  inch diameter, apricot, lower half of petal bronzy-orange; margins of petals curled. June 2.

BRILLIANT (Wood), H.C.—Characters as 'Aurantiacum.' June 4.

*Orange-pink.*

AWARDS.

Watergate Pink, H.C. June 11, 1925. Raised and sent by Messrs. Christy.

Salmon Queen, C. June 11, 1925. Raised by Messrs. Wares and sent by Messrs. Wood and Hemsley.

Magnificent, C. June 10, 1924. From the R.H.S.

SALMON QUEEN (Wood, Hemsley), C.—Foliage bright dark green; flowers  $1\frac{1}{2}$  inch diameter, salmon-orange, base orange; fades somewhat. June 8.

PILOT (Hemsley).—Foliage dark green; flowers  $1\frac{1}{2}$  inch diameter, orange-pink, base orange. June 8.

WATERGATE PINK (Christy), H.C.—Foliage dark green; flowers  $1\frac{1}{2}$  inch diameter, bright pale salmon-terra-cotta, base tinged orange; petals wavy. June 4.

PEARSON'S SALMON-RED (Wood).—Foliage dark green; flowers  $1\frac{1}{2}$  inch diameter, salmon-orange-buff, base orange. June 2.

MAGNIFICENT (R.H.S.), C.—Foliage medium green; flowers  $1\frac{1}{2}$  inch diameter, bright salmon-orange, base shaded orange. June 5.

*Rose-pink.*

AWARD.

Wisley Pink } C. June 10, 1924 { Sent by Messrs. Notcutt.  
 Rhodanthe carneum } Sent by Mr. Christy.

ALPINUM (Bakers, R.H.S.).—Foliage dark green; flowers  $\frac{9}{10}$  inch diameter, pale rose-pink, base darker, held erect. May 28.

DORIS HEMSLEY (Hemsley).—Foliage dark green; flowers  $1\frac{1}{2}$  inch diameter, pale rose-pink, base tinged orange, held erect. May 28.

ROSE QUEEN (Wood).—Foliage dark green; flowers  $1\frac{1}{2}$  inch diameter, pale amaranth-pink, base darker. June 6.

PEARSON'S PINK (Wood).—Characters as 'Rose Queen.'

WISLEY PINK (Notcutt), C.—Foliage grey-green; flowers  $1\frac{1}{2}$  inch diameter; pale rosolane-pink, base orange. May 30.

RHODANTHE CARNEUM (Christy), C.—Characters as 'Wisley Pink.'

PINK BEAUTY (Notcutt).—Foliage dark green; flowers  $1\frac{1}{2}$  inch diameter; deep rose-pink, base deeper, held erect. June 4. Distinct from variety sent under this name by Messrs. Bakers.

#### Rose.

#### AWARD.

Pink Beauty, C. June 10, 1924. Sent by Messrs. Bakers.

GARIBALDI (Wood).—Foliage grey-green; flowers  $1\frac{3}{8}$  inch diameter, pale rose, base orange. May 21.

HYMETICUM (R.H.S.).—Foliage medium green; flowers  $1\frac{3}{8}$  inch diameter, pale rose, base tinged orange, held erect. June 2.

ROSEUM (Christy).—Foliage grey-green; flowers  $1\frac{1}{2}$  inch diameter; bright rose, base darker, tinged orange. May 28.

GOODWOOD AMABILE (Christy).—Much like 'Roseum,' but of a somewhat darker shade.

PINK BEAUTY (Bakers), C.—Foliage grey-green; flowers  $1\frac{1}{2}$  inch diameter, bright rose, base darker, somewhat tinged orange. May 28.

SUNBEAM (Hemsley).—Foliage medium grey-green; flowers  $1\frac{1}{2}$  inch diameter old rose, base darker, shaded orange; flowers drooping. May 26.

TERRA-COTTA (R.H.S.).—Characters as 'Sunbeam.' May 27.

#### Rosy-red.

#### AWARDS.

Rosy Gem, H.C. June 11, 1925. Sent by Messrs. Bakers.

Ben Ledi, H.C. June 10, 1924. Raised and sent by Mr. Nicoll.

Jock Scott, H.C. June 11, 1925. Raised and sent by Mr. Christy. (C. 1924.)

Fire Dragon, H.C. June 10, 1925. From the R.H.S.

Ben Avon, C. June 10, 1925. Raised and sent by Mr. Nicoll.

Watergate Ruby, C. June 10, 1925. Raised and sent by Mr. Christy.

ROSY GEM (Bakers), H.C.—Foliage dark bright green; flowers  $1\frac{1}{10}$  inch diameter, deep bright tyrian-rose, base deep orange. May 28.

WATERGATE RUBY (Christy), C.—Much like 'Rosy Gem,' but flowers of a somewhat paler shade. May 28.

CROFTIANUM (Backhouse).—Much like 'Watergate Ruby,' but of a somewhat duller shade. Foliage grey-green. May 26.

BEN AVON (Nicoll), C.—Foliage medium green; flowers  $1\frac{3}{8}$  inch diameter, bright tyrian-rose, base tinged orange. June 2.

BEN LEDI (Nicoll), H.C.—Foliage dark green; flowers  $1\frac{3}{8}$  inch diameter, bright deep tyrian-rose, base deep orange. June 2.

FIRE DRAGON (R.H.S.), H.C.—Foliage grey-green; flowers  $1\frac{1}{4}$  inch diameter, rosy orange-cerise, base orange. June 4.

CRIMSON (R.H.S.).—Foliage dark green; flowers  $1\frac{1}{2}$  inch diameter, bright rosy-cerise, base tinged orange, held erect. June 8.

JOCK SCOTT (Christy), H.C.—Foliage dark bright green; flowers  $1\frac{1}{4}$  inch diameter, bright deep rosy-cerise, base suffused orange with a darker zone round eye, flat, held erect. June 2.

#### Scarlet.

#### AWARD.

Ben Venue, A.M. June 10, 1924. Raised and sent by Mr. Nicoll.

BEN VENUE (Nicoll), A.M.—Foliage dark green; flowers  $1\frac{1}{2}$  inch diameter, bright scarlet-orange, base somewhat darker, flat, held erect. June 4.

H. VENUSTUM (SYN. H. COCCINEUM) (Bakers).—Foliage dark green; flowers  $1\frac{1}{2}$  inch diameter, scarlet, base lemon-yellow. June 4.

SINGLE RED (Wisley).—Characters as 'H. venustum.'

RED DRAGON (Hemsley).—Characters as 'H. venustum.'

FIRE QUEEN (Morris).—Characters as 'H. venustum.'

*Crimson.*

AWARD.

**BEN LUI, A.M.** June 11, 1925. Raised and sent by Mr. Nicoll.

**BEN LUI** (Nicoll), A.M.—Foliage very dark green, flowers  $1\frac{1}{2}$  inch diameter, bright deep crimson, base tinged orange, held erect. June 2.

**B. Double Varieties.**

*White.*

**DOUBLE WHITE** (R.H.S.).—Foliage dark green; flowers  $\frac{7}{8}$  inch diameter, creamy-white, outer petals tinged red on reverse; buds pinkish. June 8.

*Yellow.*

**JUBILEE** (Wood).—Foliage dark green; flowers  $\frac{3}{4}$  inch diameter, primrose-yellow, drooping. May 29.

**DOUBLE YELLOW** (Aldersey).—Too much like 'Jubilee.' June 6.

**H. LUTEUM PLENUM** (Wood). Foliage dark green; flowers 1 inch diameter, bright golden-yellow, drooping. June 6.

*Orange.*

**DOUBLE ORANGE** (Notcutt).—Foliage dark green; flowers  $1\frac{1}{2}$  inch diameter, bright xanthine-orange, drooping. June 5.

*Salmon-orange.*

**MULTIFLEX** (Wood).—Foliage dark green; flowers  $\frac{3}{4}$  inch diameter, deep salmon-orange, base orange, drooping. June 7.

*Scarlet.*

**MRS. C. W. EARLE** (Wood).—Foliage dark green; flowers 1 inch diameter, scarlet, base lemon-yellow. June 4.

**H. VENUSTUM COCCINEUM FLORE PLENO** (Baker).—Characters as 'Mrs. C. W. Earle.'

**DOUBLE RED** (R.H.S.).—Characters as 'Mrs. C. W. Earle.'

**EARLHAMII** (Morris).—Characters as 'Mrs. C. W. Earle.'

## DELPHINIUMS AT WISLEY, 1924-25.

Three hundred and sixteen stocks of Delphiniums, representing two hundred and thirty-four varieties, were planted at Wisley in November 1923 in clumps of three plants of one variety in three long lines. The ground had been used for sweet peas for the three years before and was in excellent condition. It was deeply dug before the plants were put in, and for the most part they grew well and flowered fairly in 1924, but as they had not come to their best by that time judging was postponed until 1925, when the two long walks made by the plantings, with their tall spires of blue and mauve, provided a very fine spectacle, and gave an excellent opportunity for visitors to see the varieties now in cultivation and the Committee to judge of their relative merits. A considerable number of recommendations for awards were made, as will be seen from the notes below, but it will also be seen that these awards are spread over a great number of colour groups and that the varieties cover a long season of flowering. The date given at the end of each descriptive note indicates when the variety was becoming effective, and the date of the award usually shows when it was about at its best.

The following, represented in the present trial, have received awards in previous years, but these were passed over by the judging Committee on this occasion.

Moerheimii [A.M. 1917 (Barr, Ruys, Forbes)]; Belladonna grandiflora [A.M. 1917 (Ruys)]; Belladonna semiplenum [A.M. 1910 (Perry)]; Beauty of Langport [A.M. 1895 (Kelway)]; Lize van Veen [A.M. 1912 (Box)]; Rozenlust [A.M. 1917 (Ruys)]; Lavanda [A.M. 1912 (Ferguson)]; Mauve Queen [A.M. 1911 (Ferguson)]; Lovely [A.M. 1912 (Kelway)]; Theodora [A.M. 1910 (Ferguson)]; Harry Smetham [A.M. 1917 (Ruys, Blackmore & Langdon)]; The Alake [A.M. 1907 (Clark)]; Dusky Monarch [A.M. 1912 (Kelway)]; Sir Douglas Haig [A.M. 1919 (Blackmore & Langdon)].

## AWARDS, DESCRIPTIONS, AND NOTES.

## A. Belladonna type.

*Flowers white.*

MOERHEIMII (Ruys, Egmond).—4½ feet. See JOURNAL R.H.S., vol. 43, p. 466. June 23.

*Flowers pale blue.*

Eye light.

AWARDS.

Captivant, H.C. June 17, 1925. Sent by Messrs. B. Ruys, Holland.

Persimmon, H.C. June 17, 1925. Sent by Messrs. Ruys.

Capri, H.C. June 29, 1925. Sent by Messrs. Ruys and Messrs. Egmond, Holland. (A.M. 1917.)

Nassau, H.C. June 17, 1925. Sent by Messrs. Egmond.

SCHWALBACH (Ruys).—5 feet. Spike somewhat tapering, 18 inches long; side spikes many; flowers 1½ inch, very light sky-blue; eye white flushed pale blue. June 26.

MUSIS SACRUM (Blackmore & Langdon, Egmond).—5 feet. Spike somewhat tapering, 2 to 2½ feet long; side spikes many; flowers 1½ inch, light sky-blue; eye white flushed pale lavender. June 16.



CAPTIVANT (Ruys), H.C.—4½ feet. Spike 15 to 17 inches long; side spikes many, strong; flowers 1½ inch, pale sky-blue-grey flushed pale amaranth-pink; eye white, margins flushed lilac. June 11.

BELLADONNA GRANDIFLORA (Ruys).—4½ feet. See JOURNAL R.H.S., vol. 43, p. 466. June 20.

PERSIMMON (Ruys), H.C.—5½ feet. Spike 18 to 22 inches long; side spikes many; flowers 1½ inch, sky-blue spotted mauve near tips; eye creamy-white, hairs yellow. June 14.

CAPRI (Ruys, Egmond), H.C.—5 feet. Spike 2 feet long, crowded; side spikes many, of medium vigour; flowers 1½ to 1¾ inch, sky-blue tipped mauve; eye white flushed pale lavender. June 16.

CAPT. HARRY GILMOUR (Forbes).—5½ feet. Spike tapering, 2 feet long; side spikes many, of medium vigour; flowers 1¾ inch diameter, neropaline-blue; eye white flushed lavender. June 23.

NASSAU (Egmond), H.C.—5½ feet. Spike 15 to 22 inches long; side spikes many; flowers 1¾ inch, light forget-me-not blue; eye white flushed pale lavender-blue. June 10.

FANNY STORMOUTH (Ruys).—See JOURNAL R.H.S., vol. 43, p. 467. 5½ feet. Flowers 1¾ inch, forget-me-not blue. June 16.

BELLADONNA SEMIPLENUM (Ruys, Egmond).—3½ feet. Spike 12 inches long; side spikes medium, weak; flowers 1½ inch, semi-double, pale sky-blue, inner petal tips flushed pale lilac; eye brownish. June 12.

*Flowers dark blue.*

#### AWARDS.

Mrs. J. S. Brunton, A.M. June 17, 1925. Raised by Messrs. Ruys and sent by Messrs. Ruys, Egmond, and Forbes of Hawick.

Mrs. Thomson, A.M. June 29, 1925. Raised by Messrs. Ruys and sent by Messrs. Ruys and Egmond.

Orion, H.C. July 6, 1925. Raised by Mr. F. Koppius and sent by Messrs. Bakers of Codsall, Thompson & Morgan of Ipswich, Ruys and Egmond.

Novice, H.C. June 29, 1925. Raised by Mr. Hendriksen and sent by Messrs. Egmond.

Lamartine, H.C. June 29, 1925. Sent by Messrs. Ruys, Egmond, and Jones of Lewisham, S.E. (A.M. 1917.)

Horatius, H.C. June 29, 1925. Raised by Mr. Koppius and sent by Messrs. Egmond, Ruys.

#### Eye light.

Mrs. J. S. Brunton (Ruys, Egmond, Forbes), A.M.—5 feet. Spike 18 to 20 inches long; side spikes many; flowers 1½ inch, bright forget-me-not blue; eye white flushed pale lilac. June 14.

ORION (Bakers, Thompson & Morgan, Ruys, Egmond), H.C.—5½ feet. Spike 16 inches long; side spikes many, weak; flowers 1½ inch, bright forget-me-not blue, darker than 'Mrs. J. S. Brunton'; eye white. July 6.

NOVICE (Egmond), H.C.—5½ feet. Spike 2 feet long; side spikes many, of medium vigour; flowers 2 inches, bright medium gentian-blue; eye white flushed violet-blue. June 26.

ARNOLD BÖCKLIN (Ruys).—5½ feet. Spike somewhat tapering, 2 feet long; side spikes many, of medium vigour; flowers 1½ inch, semi-double, bright deep gentian-blue; eye white, margins flushed pale azure-blue. June 26.

SKY-BLUE (Egmond).—4 feet; very compact; spike blunt, 15 to 18 inches long; side spikes many, weak; flowers 1½ inch, dull violaceous blue; eye white flushed lavender. June 20.

§LAMARTINE (Ruys, Egmond, Jones), H.C.—4½ feet. Spike 18 inches long; side spikes many, weak; flowers 1½ inch, deep violet-purple; eye white flushed pale violet-purple. June 20.

#### Eye dark.

HORATIUS (Egmond, Ruys), H.C.—5 feet; spike 18 to 24 inches long; side spikes many, weak; flowers 2 inches, semi-double, deep forget-me-not blue; eye dirty brownish-white. June 26.

THEODORA (Egmond, Ruys).—5½ feet; spike 2 feet long; side spikes many, strong; flowers 1½ inch, bright pale gentian-blue; eye brown. June 26.

Mrs. Thomson (Ruys, Egmond), A.M.—5 feet; spike somewhat blunt, 15 to 18 inches long; side spikes many, weak; flowers 1½ inch, bright gentian-blue; eye brownish, margins pale gentian-blue. June 12.

. *Elatum* type.*Flowers white.*

## AWARD.

Mrs. Christie Miller, H.C. July 6, 1925. Raised and sent by Messrs. Blackmore & Langdon of Bath (A.M. 1921).

## SINGLE.

BEAUTY OF LANGPORT (Ruys).—See JOURNAL R.H.S., vol. 43, p. 466. 5½ feet. June 28.

## SEMI-DOUBLE.

Mrs. CHRISTIE MILLER (Blackmore & Langdon), H.C.—5 feet; spike somewhat tapering, 18 inches long; side spikes many, strong; flowers 2 inches, creamy-white; anthers greenish-brown. July 6.

## DOUBLE.

SYLPH (Gifford).—4½ feet; spike blunt, 9 to 12 inches long; side spikes many, weak; flowers 2 inches, white; eye large, cream. July 6.

PROGRESSION (Ruys).—See JOURNAL R.H.S., vol. 43, p. 476. 5½ feet. July 1.

*Flowers pale blue.*

## AWARDS.

Blue Princess, A.M. June 29, 1925. Raised and sent by Messrs. Blackmore & Langdon.

Mrs. Townley Parker, A.M. June 29, 1925. Raised and sent by Messrs. Blackmore & Langdon. (A.M. 1923.)

Lize, A.M. June 29, 1925. Raised by Messrs. van Veen and sent by Messrs. Egmond, Ruys, Jones.

Sister Clare, A.M. July 6, 1925. Raised and sent by Messrs. Gifford of Hornchurch.

Queen Mary, A.M. July 6, 1925. Raised and sent by Messrs. Blackmore & Langdon.

Blue Bedder, H.C. July 6, 1925. Raised and sent by Messrs. Blackmore & Langdon.

Mrs. Roper, H.C. June 29, 1925. Sent by Messrs. Jones and Egmond.

Blue Queen, H.C. July 6, 1925. Raised and sent by Messrs. Blackmore & Langdon. (A.M. 1920.)

Elegance, H.C. June 29, 1925. Raised and sent by Messrs. Blackmore & Langdon.

## SINGLE.

Eye light.

BLUE PRINCESS (Blackmore & Langdon), A.M.—6½ feet; spike 2 to 2½ feet long; side spikes few, strong; flowers 2 inches, pale sky-blue with a faint lilac flush; eye creamy-white. June 16.

BLUE BEDDER (Blackmore & Langdon), H.C.—5 feet; habit compact; spike somewhat tapering, 2 feet long; side spikes many, strong; flowers 2 inches, pale sky-blue with occasional very faint pale mauve flush; eye white. June 25.

Mrs. TOWNLEY PARKER (Blackmore & Langdon), A.M.—7 feet; spike 2 feet long; side spikes many, of medium vigour; flowers 1½ inch, pale sky-blue; eye white. June 24.

METEOR (Egmond).—6 feet; spike 2 feet long; side spikes many, strong; flowers 1½ inch, deep sky-blue; eye cream. June 22.

LIZE VAN VEEN (Egmond, Jones, Ruys).—5½ feet; spike 2½ feet long; side spikes many, strong; flowers 2½ inches, pale forget-me-not blue with a faint lilac flush; eye creamy-white. June 20. Also sent under the name 'Lord Derby' by Messrs. Jones in error.

Mrs. G. F. HENERIK (Ruys).—7 feet. Much like 'Lize van Veen' in colour, but foliage less broadly divided. June 14.

QUEEN WILHELMINA (Ruys, Jones).—7 feet; spikes 2½ feet long; side spikes many, strong; flowers 1½ inch, pale porcelain-blue, side petals flushed pale mauve; eye white. June 20.

LADY MANDER (Bakers, Ruys).—6½ feet; spike 2 feet long; side spikes many, strong; flowers 1½ inch, pale cerise-blue; eye white. June 26.

LIZE (Egmond, Ruys, Jones), A.M.—6 feet; spike 2 to 2½ feet long; side spikes few, strong; flowers 2 to 2½ inches, wedgwood-blue, margins of side petals flushed mauve; eye creamy-white. June 19. Also sent under the name 'Queen Wilhelmina' by Messrs. Forbes in error.

MRS. ROPER (Egmond, Jones), H.C.—7½ feet; spike somewhat tapering, 2 to 2½ feet long; side spikes many, strong; flowers 1½ inch, pale forget-me-not blue with a trace of pale mauve; eye white, flushed faint pale blue. June 22.

JOHN FORBES (Forbes).—6½ feet; spike blunt, 12 inches long; side spikes many, of medium strength; flowers 1½ inch, pale forget-me-not blue; eye white. June 24.

OLIVIA (Forbes).—7 feet; spike 2 to 2½ feet long; side spikes many, strong; flowers 1½ inch, pale forget-me-not blue, centre of petals faintly flushed mauve; eye white. June 24.

YVETTE GUILBERT (Ruys).—5½ feet. See JOURNAL R.H.S., vol. 43, p. 469, June 26.

SISTER CLARE (Gifford), A.M.—6 feet; spikes somewhat tapering, 2 feet long; side spikes many, strong; flowers 2 inches, pale forget-me-not blue, side petals occasionally flushed pale mauve; eye large, white. June 28.

LUDWIG WÜLLNER (Jones).—6½ feet; spike 18 to 22 inches long; side spikes many, strong; flowers 2 inches, pale forget-me-not blue; eye white. June 29.

#### Eye dark.

VIANEN (Egmond).—4½ feet; spike 2 to 2½ feet long; side spikes medium, strong; flowers 1½ inch, very pale forget-me-not blue; eye blackish-brown. June 14.

DUCHESS OF SUTHERLAND (Forbes).—6 feet; spike somewhat tapering, 2 feet long; side spikes many, strong; flowers 1½ inch, pale forget-me-not blue, with a faint mauve flush; eye brownish. June 28.

QUEEN OF BATH (Blackmore & Langdon).—6 feet; spike 18 to 24 inches long; side spikes medium, of medium vigour; flowers 2 inches, pale forget-me-not blue, margins faintly tinged mauve; eye blackish-brown. June 28.

BLUE QUEEN (Blackmore & Langdon), H.C.—7 feet; spike 2½ feet long; side spikes many, strong; flowers 1½ inch, medium forget-me-not blue; eye blackish-brown. June 28.

#### SEMI-DOUBLE.

LORD KITCHENER (Forbes).—6 feet. See JOURNAL R.H.S., vol. 43, p. 472, June 25.

ELEGANCE (Blackmore & Langdon), H.C.—6 feet; spike 18 inches long; side spikes many, strong; flowers 2 inches, pale sky-blue, margins faintly flushed pale mauve; eye large, white. June 23.

QUEEN MARY (Blackmore & Langdon), A.M.—6½ feet; spikes 2½ feet long; side spikes many, of medium vigour; flowers 1½ inch, forget-me-not blue; eye white. June 18.

#### Flowers dark blue.

#### AWARDS.

Constance, A.M. June 17, 1925. Raised and sent by Messrs. Blackmore & Langdon.

Johan, A.M. June 29, 1925. Raised by Mr. Heemerik and sent by Messrs. Egmond.

Blue Boy, A.M. July 6, 1925. Raised and sent by Messrs. Blackmore & Langdon (A.M. 1923.)

Hugh Mitchell, A.M. June 29, 1925. Raised and sent by Messrs. Bakers of Codsall

Walter T. Ware, A.M. June 17, 1925. Raised and sent by Messrs. Blackmore & Langdon.

Corry, A.M. June 17, 1925. Raised by Mr. Koppius and sent by Messrs. Jones, Forbes, Ruys.

Blue Bird, A.M. June 17, 1925. Introduced and sent by Messrs. Tucker of Oxford. (A.M. 1920.)

Duke of Connaught, H.C. July 6, 1925. Sent by Messrs. Jones.

Col. Douglas, H.C. June 29, 1925. Raised by Messrs. Blackmore & Langdon and sent by Messrs. Blackmore & Langdon, Ruys.

Carrie, H.C. July 6, 1925. Sent by Messrs. Ruys.

## SINGLE.

## Eye light.

LORD LANSDOWNE (Blackmore & Langdon, Ruys).—7 feet. See JOURNAL R.H.S., vol. 43, p. 467. Flowers pale gentian-blue. July 3.

LADY HAMMICK (Blackmore & Langdon).—6½ feet; spike 2 feet long; side spikes many, strong; flowers 1½ inch, pale gentian-blue; eye white. June 20.

JAS. P. ROBERTSON (Forbes).—5½ feet; spike somewhat tapering, 2 to 2½ feet long; side spikes many, strong; flowers 1½ inch, medium gentian-blue; eye white. June 22.

N. F. BARNES (Forbes).—7 feet. See JOURNAL R.H.S., vol. 43, p. 470. June 22.

JULEA (Egmond).—7 feet; spike 2½ to 3 feet long; side spikes few, of medium vigour; flowers 2 inches, pale ultramarine-ash; eye creamy-white. June 14.

CONSTANCE (Blackmore & Langdon), A.M.—6½ feet; spike 2½ to 3 feet long; side spikes medium, strong; flowers 2½ inches, pale ultramarine-ash; eye white. June 14.

JOHAN (Egmond), A.M.—6½ feet; spike somewhat tapering, 2 to 2½ feet long; side spikes medium, of medium vigour; flowers 2 inches, pale ultramarine-ash, margins flushed lilac; eye white. June 14.

BLUE BOY (Blackmore & Langdon), A.M.—8½ feet; spike 2½ to 3 feet long; side spikes many, strong; flowers 1½ inch, ultramarine-ash; eye creamy-white. June 28.

MRS. JOHN MICKIE (Forbes).—6 feet; spike somewhat tapering, 2 feet long; side spikes many, weak; flowers 1½ inch, ultramarine-ash; eye white. July 6.

DUKE OF CONNAUGHT (Jones), H.C.—6½ feet; spike 2 feet long; side spikes few, of medium vigour; flowers 2 inches, bright azure-blue, margins of petals darker; eye creamy-white. June 18.

JOAN (Jones).—6 feet; spike somewhat tapering, 2½ feet long; side spikes medium, of medium vigour; flowers 2½ inches, bright azure-blue, margins flushed Mathew's purple; eye white. June 14.

BRILLIANT (Jones).—6½ feet; spike 16 to 18 inches long; side spikes many, of medium vigour; flowers 2 inches, azure-blue, margins flushed violet; eye white. June 23.

K. TH. CARON (Ruys).—4 feet. See JOURNAL R.H.S., vol. 43, p. 470. June 25.

COL. DOUGLAS (Blackmore & Langdon, Ruys), H.C.—7 feet; spike 2 to 2½ feet long; side spikes very few, weak; flowers 1½ inch, pale ultramarine-ash with a very faint lilac tinge; eye dark brown. June 15.

LADY RAVENSWORTH (Ruys).—6½ feet. See JOURNAL R.H.S., vol. 43, p. 468. June 23.

GARTH (Forbes).—6 feet. See JOURNAL R.H.S., vol. 43, p. 471. June 28.

## SEMI-DOUBLE.

## Eye light.

HUGH MITCHELL (Bakers), A.M.—6½ feet; spike somewhat tapering, 18 inches long; side spikes few, weak; flowers 2 inches, deep azure-blue; eye white, anthers brownish. June 14.

WALTER T. WARE (Blackmore & Langdon), A.M.—6 feet; spike somewhat tapering, close, 2 feet long; side spikes medium, strong; flowers 2½ to 2¾ inches, dark bluish-violet; eye creamy-white streaked dark violet. June 14.

## Eye dark.

CARRIE (Ruys), H.C.—5½ feet; spike 2 feet long; side spikes medium, of medium vigour; flowers 2 to 2½ inches, pale azure-blue, inner margins flushed mauve; eye deep brown. June 25.

CORRY (Jones, Forbes, Ruys), A.M.—7 feet; spike 2 to 2½ feet long, crowded; side spikes few, strong; flowers 1½ inch, outer petals gentian-blue, inner Mathew's purple flushed gentian-blue; eye dull brown. June 15.

BLUE BIRD (Tucker), A.M.—7 feet; spike somewhat loose, 2½ feet long; side spikes many, of medium vigour; flowers 1½ inch, deep azure-blue; eye brown streaked azure-blue. June 12.

C. W. MATTHES (Ruys, Egmond, Thompson & Morgan).—8 feet; spike close, 2½ to 3 feet long; side spikes many, strong; flowers 1½ inch, deep forget-me-not blue; eye dark brown. June 20.

*Flowers mauve.*

## AWARDS.

Mrs. Shirley, A.M. July 6, 1925. Raised by Messrs. Blackmore & Langdon, and sent by Messrs. Blackmore & Langdon and Jones. (A.M. 1917.)

Mrs. Willy van Egmond, A.M. June 29, 1925. Raised and sent by Messrs. Egmond.

Mrs. Colin McIver, A.M. June 17, 1925. Raised and sent by Messrs. Blackmore & Langdon. (A.M. 1916.)

Glory, H.C. June 29, 1925. Raised by Messrs. van Veen and sent by Messrs. Blackmore & Langdon, Jones, Egmond.

## SINGLE.

## Eye dark.

IDEAL (Samuel).—6½ feet; spike 2½ feet long; side spikes many, strong; flowers 2¼ inches, mauve striped forget-me-not blue; eye deep brown. July 1.

## SEMI-DOUBLE.

## Eye light.

GLORY (Blackmore & Langdon, Jones, Egmond), H.C.—5½ feet. Spike 18 inches long, crowded; side spikes few, strong; flowers 1¾ inch, very pale lilac flushed pale forget-me-not blue; eye creamy-white. June 15.

Mrs. Shirley (Blackmore & Langdon, Jones), A.M.—7½ feet; spike somewhat tapering, close, 2½ feet long; side spikes many, strong; flowers 2 inches, pale mauve, tips flushed pale blue, inner petals pale mauve; eye white. June 24.

JOHN MORGAN (Thompson & Morgan).—7 feet; spike close, 2 feet long; side spikes many, strong; flowers 2 inches, pale mauve, faintly flushed pale sky-blue, inner petals pale mauve; eye white. July 1.

MAUVE QUEEN (Egmond).—6½ feet; spike somewhat tapering, crowded, 16 inches long, side spikes many, strong; flowers 2 inches, pale mauve, margins tinged pale blue; anthers greenish. June 26.

ROZENLUST (Jones, Egmond, Ruys).—7 feet; spike close, 2 feet long; side spikes many, strong; flowers 2 inches, outer petals pale forget-me-not blue, inner pale mauve; eye white. July 6.

Mrs. Willy van Egmond (Egmond), A.M.—7 feet; spike close, 2½ feet long; side spikes many, of medium vigour; flowers 2 inches, mauve; eye creamy white. June 14.

LORENZO DE MEDICI (Jones, Ruys).—6¾ feet; spike somewhat tapering, 2 to 2½ feet long; side spikes medium, strong; flowers 2 to 2½ inches, outer petals pale forget-me-not blue, flushed mauve, inner mauve; eye creamy-white. June 24.

Mrs. Colin McIver (Blackmore & Langdon), A.M.—7 feet; spike close, 2½ feet; side spikes many, strong; flowers 2 inches, outer petals pale mauve, tips pale forget-me-not blue, inner deep mauve; eye creamy-white. June 16.

LILACINA (Ruys).—4½ feet; spike close, 18 inches long; side spikes few, weak; flowers 1½ inch, outer petals very pale forget-me-not blue, inner deep mauve; eye white. June 28.

LAVANDA (Jones, Bakers, Ruys).—6½ feet. See JOURNAL R.H.S., vol. 43, p. 472. June 24.

IPSWICH BEAUTY (Thompson & Morgan).—7 feet; spike somewhat tapering, close, 2½ feet long; side spikes many, strong; flowers 2 to 2½ inches, outer petals mauve tipped azure-blue, inner deep mauve; eye very small, white. June 28.

## Eye dark.

LA FRANCE (Egmond).—6 feet; spike somewhat loose, 2 feet long; side spikes medium, of medium vigour; flowers 1¾ inch, outer petals pale mauve, tips pale forget-me-not blue, inner mauve; eye brownish black streaked mauve. June 15.

MURILLO (Jones, Egmond).—6½ feet; spike close, 2 to 2½ feet long; side spikes few, of medium vigour; flowers 1¾ inch, outer petals pale forget-me-not blue, inner mauve, tips forget-me-not blue; anther brownish. June 22.

*Flowers pale blue and pale mauve shades.*

## AWARDS.

Col. Sir Wyndham Murray, A.M. June 29, 1925. Raised and sent by Messrs. Blackmore & Langdon. (A.M. 1917.)

Jean, A.M. July 6, 1925. Raised by Mr. F. W. Smith, introduced and sent by Messrs. Bakers.

Winsome, A.M. June 29, 1925. Raised by Mr. Smith, introduced and sent by Messrs. Jones.

Mrs. Edmundson, A.M. June 29, 1925. Raised and sent by Messrs. Jones.

Marjorie Ferguson, A.M. June 29, 1925. Raised by Mr. Ferguson, introduced and sent by Messrs. Blackmore & Langdon. (A.M. 1920.)

Queen of the Belgians, A.M. June 29, 1925. Raised by Mr. Ferguson, introduced by Messrs. Waterer, Sons & Crisp and sent by Messrs. Gifford. (A.M. 1915.)

Nora Ferguson, A.M. June 29, 1925. Raised by Mr. Ferguson, and sent by Messrs. Ruys, Jones, Blackmore & Langdon. (A.M. 1924.)

Queen of Spain, A.M. June 29, 1925. Sent by Messrs. Ruys.

Patricia, A.M. June 29, 1925. Raised and sent by Messrs. Jones.

Mrs. A. J. Watson, A.M. June 29, 1925. Raised and sent by Messrs. Blackmore & Langdon. (A.M. 1917.)

Millicent Blackmore, A.M. July 6, 1925. Raised by Messrs. Blackmore & Langdon, and sent by them and Messrs. Jones. (A.M. 1919.)

Dainty, H.C. June 29, 1925. Raised by Mr. Smith and sent by Messrs. Bakers.

Elaine Lettor, H.C. July 6, 1925. Raised and sent by Messrs. Jones.

Miss W. B. Mackintosh, H.C. July 6, 1925. Raised and sent by Mr. Bones of Cheshunt.

Butterfly, H.C. June 29, 1925. Raised and sent by Messrs. Bakers.

Mrs. Andrew Carnegie, H.C. July 6, 1925. Sent by Messrs. Ruys, Jones, Forbes.

Marie Closon, H.C. July 6, 1925. Raised by Messrs. Ruys and sent by them and Messrs. Egmond.

David, H.C. July 6, 1925. Raised by Mr. Smith and sent by Messrs. Bakers.

Cecilia, H.C. July 6, 1925. Raised and sent by Messrs. Jones.

Derbyshire, H.C. July 6, 1925. Raised and sent by Messrs. Ballington of Matlock.

#### SINGLE.

##### Eye light.

DELIGHTFUL (Jones).—7 feet; spike 2 to 2½ feet long; side spikes many, strong; flowers 2 inches, very pale cerise-blue, flushed very pale mauve; eye white. June 23.

THE MUMSY (Jones).—5½ feet; spike blunt, close, 9 to 12 inches long; side spikes few, weak; flowers 1½ inch, pale forget-me-not blue flushed mauve; eye white. July 4.

SIR GEORGE McRAE (Forbes).—6½ feet; spike 2 feet long; side spikes medium, weak; flowers 1½ inch; forget-me-not blue, margins of petals flushed mauve; eye creamy-white. June 16.

COL. SIR WYNDHAM MURRAY (Blackmore & Langdon), A.M.—7½ feet; spike 2½ to 3 feet long; side spikes many, strong; flowers 2 inches, bright deep cerise-blue, flushed deep mauve at margins; eye white. June 22.

##### Eye dark.

FAIRIE QUEEN (Blackmore & Langdon).—7½ feet; spike close, 2½ feet long; side spikes many, strong; flowers 1½ inch, very pale lilac, faintly flushed pale blue; eye brown. June 15.

#### SEMI-DOUBLE.

##### Eye light.

MRS. GODFREY BAILWARD (Jones).—7½ feet; spike somewhat tapering, close, 2 feet long; side spikes many, strong; flowers 2 to 2½ inches, outer petals pale cerise-blue, inner very pale mauve; eye white. July 4.

MATHURN (Jones).—6 feet; spike somewhat tapering, close, 18 to 24 inches long; side spikes medium, of medium vigour; flowers 2 inches, very pale cerise-blue flushed very pale mauve; eye white. June 15.

JEAN (Bakers), A.M.—7 feet; spike close, 2 feet long; side spikes many, of medium vigour; flowers 1½ inch, outer petals pale cerise-blue, inner flushed pale mauve; eye white. June 23.

MRS. R. C. PULLING (Jones).—6½ feet; spike 18 to 24 inches long; side spikes many, strong; flowers 2½ inches, outer petals light cerise-blue, margins flushed mauve, inner flushed mauve; eye white. June 26.

WINSOME (Jones), A.M.—6½ feet; spike somewhat tapering, close, 2½ feet long; side spikes many, strong; flowers 2 inches, outer petals very pale sky-blue, inner flushed pale mauve; eye white irregularly streaked pale mauve. June 15.

MRS. EDMUNDSON (Jones), A.M.—6¼ feet; spike somewhat blunt, close, 2 feet long; side spikes many, strong; flowers 2½ inches, outer petals very pale sky-blue, inner with a faint pale mauve flush; eye white. June 25.

DAINTY (Bakers), H.C.—7 feet; spike close, 18 to 24 inches long; side spikes many, strong; flowers 1½ inch, outer petals pale sky-blue, inner pale mauve; eye white. June 24.

MARJORIE FERGUSON (Blackmore & Langdon), A.M.—7 feet; spike close, 2½ feet long; side spikes many, strong; flowers 2½ to 2½ inches, outer petals pale forget-me-not blue, inner margins pale sky-blue; eye white. June 25.

ELAINE LETTOR (Jones), H.C.—6 feet; spike somewhat tapering, close, 18 to 24 inches long; side spikes many, weak; flowers 2 to 2½ inches, outer petals pale sky-blue, inner pale mauve; eye white. July 1.

CARL V. LANGE (Ruys).—Much like 'Elaine Lettor' but spike tapering and side spikes strong; flowers 1½ inch; eye white streaked pale mauve. June 16.

ARIEL (Jones).—6½ feet; spike close, 18 to 24 inches long; side spikes many, weak; flowers 1½ inch, outer petals pale forget-me-not blue, margins flushed pale mauve, inner pale mauve; eye white streaked pale mauve. June 28.

QUEEN OF THE BELGIANS (Gifford), A.M.—5½ feet; spike 2 feet long; side spikes many, strong; flowers 3 inches, outer petals pale forget-me-not blue, inner pale mauve, margins blue; eye white. June 22.

MRS. E. STILWELL (Jones).—7½ feet; spike 2 to 2½ feet long; side spikes many, strong; flowers 2 inches, outer petals pale forget-me-not blue, inner margins flushed pale mauve; eye white. July 1.

PENELOPE (Turner).—7 feet; spike somewhat tapering, close, 2 feet long; side spikes many, of medium vigour; flowers 2 inches, outer petals pale forget-me-not blue, inner flushed pale mauve; eye white. June 22.

GAITY (Jones).—7 feet; spike close, 18 inches long; side spikes many, strong; flowers 2 to 2½ inches, pale forget-me-not blue; eye white. June 23.

HUGO POORTMAN (Ruys).—8 feet. See JOURNAL R.H.S., vol. 43, p. 471. June 29.

GLORY OF THE VALLEY (Pudor).—6½ feet; spike 18 to 24 inches long; side spikes many, of medium vigour; flowers 2 inches, outer petals pale forget-me-not blue, inner pale mauve, flushed blue; eye white. June 20.

FREEDOM (Jones).—7 feet; spike crowded, 2½ feet long; side spikes many, strong; flowers 2 inches, outer petals pale forget-me-not blue, inner pale mauve; eye white. July 1.

NORA FERGUSON (Ruys, Jones, Blackmore & Langdon), A.M.—6 feet; spike somewhat tapering, crowded, 2½ to 3 feet long; side spikes many, strong; flowers 2½ inches, outer petals sky-blue, inner flushed pale mauve; eye white. June 25.

MISS W. B. MACKINTOSH (Bones), H.C.—6½ feet; spike crowded, 2 feet long; side spikes many, of medium vigour; flowers 2 to 2½ inches, outer petals pale mauve, margins flushed forget-me-not blue, inner mauve, margins flushed blue; eye white. June 24.

WILLY O'BRIEN (Jones, Blackmore & Langdon, Ruys).—7 feet. See JOURNAL R.H.S., vol. 43, p. 473. July 1.

BUTTERFLY (Bakers), H.C.—6½ feet; spike crowded, 2½ feet long; side spikes many, strong; flowers 2 inches, outer petals pale sky-blue, margins and centre flushed pale mauve, inner pale mauve; eye white. June 25.

QUEEN OF SPAIN (Ruys), A.M.—7 feet; spike somewhat tapering, rather crowded, 2½ to 3 feet long; side spikes medium, of medium vigour; flowers 1½ to 2 inches, outer petals pale forget-me-not blue, inner mauve; eye creamy-white. June 15.

RYECROFT (Jones).—7 feet; spike 2 feet long; side spikes many, strong; flowers 1½ inch, outer petals sky-blue, inner mauve edged sky-blue; eye white. July 10.

ERNEST (Jones).—6 feet; spike somewhat tapering, crowded, 18 to 24 inches long; side spikes many, of medium vigour; flowers 1¼ to 1½ inch, forget-me-not blue, streaked mauve; eye white. June 26.

MRS. EDWIN RADFORD (Jones).—6½ feet; spike crowded, 2 feet long; side spikes many, strong; flowers 2 inches, outer petals pale forget-me-not blue, inner mauve; eye white. June 15.

MANNY NEEB (Jones).—7½ feet; spike loose, 2 to 2½ feet long; side spikes many, of medium vigour; flowers 1½ inch, outer petals pale forget-me-not blue flushed pale mauve, inner mauve; eye white, streaked pale mauve. July 2.

MRS. ANDREW CARNEGIE (Ruys, Jones, Forbes), H.C.—7½ feet; spike loose, 2½ to 3 feet long; side spikes many, strong; flowers 2 inches, outer petals medium forget-me-not blue, inner mauve; eye white. July 1.

MARIE CLOSON (Egmond), H.C.—6½ feet; spike crowded, 2½ feet long; side spikes many, strong; flowers 2 to 2½ inches, outer petals forget-me-not blue, margins flushed pale mauve, inner mauve; eye white. June 23.

JACOBY (Egmond).—6½ feet; spike somewhat loose, 18 to 24 inches long; side spikes many, weak; flowers 1½ inch, pale ultramarine, base of petals flushed mauve; eye white. June 28.

BLUE STAR (Jones).—8 feet; spike somewhat tapering, crowded, 18 inches long; side spikes many, strong; flowers 1½ inch, outer petals forget-me-not blue, inner mauve; eye large, white. July 3.

MISS D. ADAMS (Jones).—7½ feet; spike somewhat tapering, crowded, 18 inches long; side spikes many, strong; flowers 2 inches, outer petals pale azure-blue, inner mauve; eye white. July 6.

DAVID (Bakers), H.C.—7 feet; spike somewhat crowded, 2 to 2½ feet long; side spikes many, strong; flowers 2 inches, outer petals pale forget-me-not blue, margins flushed pale mauve, inner mauve; eye white. June 26.

BOERHAVE (Jones).—9 feet; spike dense, 3 feet long; side spikes many, strong; flowers 2 inches, pale forget-me-not blue, inner petals mauve; eye white. June 25.

PERFECTION (Egmond).—6½ feet; spike somewhat loose, 2 to 2½ feet long; side spikes medium, of medium vigour; flowers 1½ inch, forget-me-not blue, inner petals flushed pale mauve; eye white. June 14.

BALDERSHAGE (Ruys).—6½ feet; spike somewhat tapering, 2½ feet long; side spikes many, strong; flowers 2 inches, forget-me-not blue, inner petals flushed mauve; eye white. June 28.

{ ROSOLANE (Egmond)  
{ ROSELAIRE (Jones) }.—7 feet; spike somewhat tapering, very crowded, 2 to 2½ feet long; side spikes many, strong; flowers 1½ inch, bright forget-me-not blue, inner petals faintly flushed, mauve; eye white. July 4.

LOVELY (Bakers).—5½ feet. See JOURNAL R.H.S., vol. 43, p. 472. June 25.

Eye dark.

MRS. A. TRINDER (Trinder).—8 feet; spike somewhat tapering, crowded, 2½ to 3 feet long; side spikes many, strong; flowers 1½ inch, very pale sky-blue, inner petals very pale mauve, margins pale blue; eye dirty creamy-brown. June 20.

PATRICIA (Jones), A.M.—6½ feet; spike crowded, 2 feet long; side spikes many, strong; flowers 1½ inch, light forget-me-not blue, margins flushed pale mauve; eye blackish-brown irregularly streaked mauve. June 22.

MISS LETTICE FAIRFAX (Jones).—7½ feet; spike somewhat loose, 2 feet long; side spikes many, strong; flowers 2 inches, outer petals sky-blue, inner pale mauve; eye dark-brown. June 24.

MRS. F. P. STEWART (Jones).—8 feet; spike close, 2 feet long; side spikes many, strong; flowers 2 inches, pale sky-blue faintly flushed mauve; eye white blotched brown. June 25.

IRENE OSGOOD (Bakers).—7 feet; spike loose, 2½ feet long; side spikes many, of medium vigour; flowers 1½ inch, outer petals pale forget-me-not blue, inner very pale mauve tinged blue; eye blackish-brown. June 16.

POWERFUL (Bakers).—9 feet; spike somewhat loose, 2 to 2½ feet long; side spikes many, strong; flowers 1½ to 1¾ inch, outer petals pale forget-me-not blue, inner flushed mauve; eye blackish-brown. July 4.

MRS. A. J. WATSON (Blackmore & Langdon), A.M.—8½ feet; spike crowded, 2½ to 2¾ feet long; side spikes many, strong; flowers 2 inches, outer petals pale forget-me-not blue, inner pale mauve; eye brownish. June 16.

CECILIA (Jones), H.C.—6½ feet; spike somewhat crowded, 18 inches long; side spikes many, of medium vigour; flowers 2 inches, outer petals pale forget-me-not blue, inner pale mauve, base flushed blue; eye brownish. June 24.

LORNA DOONE (Jones).—Much like 'Cecilia' but spike less tapering and more crowded and flowers somewhat larger; eye dark brown. June 23.

MILLICENT BLACKMORE (Blackmore & Langdon, Jones), A.M.—7 feet; spike somewhat loose, 2½ feet long; side spikes many, strong; flowers 2¼ to 2½ inches, outer petals forget-me-not blue, inner pale mauve; eye blackish-brown. July 3.

MISS D. TRINDER (Trinder).—6 feet; spike somewhat tapering, somewhat loose, 2 feet long; side spikes many, strong; flowers 2 to 2½ inches, outer petals pale forget-me-not blue, inner flushed pale mauve; eye greenish-brown. June 16.

WILSON (Jones).—6 feet; spike somewhat blunt, crowded, 12 inches long;



side spikes many, weak; flowers  $1\frac{1}{8}$  inch, outer petals very pale azure-blue, inner flushed pale mauve; eye blackish-brown. June 30.

MRS. OLDOM BROOMHEAD (Jones).— $6\frac{1}{2}$  feet; spike crowded, 15 to 18 inches long; side spikes many, of medium vigour; flowers 2 inches, outer petals pale azure-blue, inner deep mauve, margins and base azure-blue; eye brownish. June 26.

DERBYSHIRE (Ballington), H.C.—7 feet; spike somewhat loose, 2 to  $2\frac{1}{2}$  feet long; side spikes many, strong; flowers 2 to  $2\frac{1}{2}$  inches, forget-me-not blue tinged mauve; eye dark brown. June 23.

HARRY SMETHAM (Blackmore & Langdon, Ruys, Egmond).—7 feet. See JOURNAL R.H.S., vol. 43, p. 475. June 22.

#### DOUBLE.

Eye dark.

MISS EDITH TUCK (Trinder).—7 feet; spike crowded, 2 feet long; side spikes many, strong; flowers  $2\frac{1}{4}$  inches, flat, outer petals very pale neropaline-blue inner pale satiny-mauve; eye brown. June 20.

*Flowers blue and mauve; mauve predominates.*

#### AWARDS.

MR. F. KOPPIUS, A.M. July 6, 1925. Raised by Mr. F. Koppius and sent by Messrs. Egmond.

MAJOR PAT A BECKETT, A.M. June 29, 1925. Raised and sent by Messrs. Jones.

WEYCOURT GEM, A.M. July 6, 1925. Raised by Mr. Smith and sent by Messrs. Jones.

ADMIRATION, A.M. June 29, 1925. Raised by Mr. Smith and sent by Messrs. Bakers.

AMOS PERRY, H.C. June 29, 1925. Sent by Messrs. Egmond, Jones. (H.C. 1917.)

THE SHAH, H.C. July 6, 1925. Raised and sent by Messrs. Blackmore & Langdon. (A.M. 1924.)

#### SINGLE.

Eye light.

MRS. H. J. JONES (Egmond).—7 feet; spike somewhat tapering, crowded, 2 to  $2\frac{1}{4}$  feet long; side spikes many, strong; flowers 2 to  $2\frac{1}{2}$  inches, sky-blue flushed pale mauve; eye white. June 25.

Eye dark.

WM. THOMPSON (Thompson & Morgan).— $8\frac{1}{2}$  feet; spike somewhat loose, 2 to  $2\frac{1}{4}$  feet long; side spikes many, strong; flowers  $1\frac{3}{4}$  to  $1\frac{7}{8}$  inch, pale mauve, tips flushed pale azure-blue; eye blackish-brown. July 10.

#### SEMI-DOUBLE.

Eye light.

ROBBIE JENKINS (Jones).— $7\frac{1}{2}$  feet; spike somewhat tapering, crowded,  $2\frac{1}{2}$  to  $2\frac{3}{4}$  feet long; side spikes many, strong; flowers 2 inches, outer petals pale forget-me-not blue, faintly flushed pale mauve, inner bright mauve; eye white. June 20.

MRS. VIOLET GESLIN (Egmond).— $5\frac{1}{2}$  feet; spike crowded, 9 to 12 inches long, side spikes many, weak; flowers  $1\frac{1}{2}$  to  $1\frac{3}{8}$  inch, outer petals forget-me-not blue, inner mauve; eye white. June 25.

MR. F. KOPPIUS (Egmond), A.M.—6 feet; spike somewhat loose,  $2\frac{1}{2}$  feet long side spikes many, strong; flowers  $2\frac{1}{4}$  to  $2\frac{1}{2}$  inches, outer petals forget-me-not blue, inner mauve; eye white. July 1.

IDA R. ELLIOTT (Ruys, Egmond).—7 feet. See JOURNAL R.H.S., vol. 43, p. 471. July 2.

MRS. J. G. DAY (Jones).— $5\frac{1}{2}$  feet; spike blunt, crowded, 18 to 24 inches long; side spikes many, strong; flowers  $1\frac{3}{8}$  to 2 inches, outer petals azure-blue, inner mauve; eye white. July 3.

RUBY (Bakers).—6 feet; spike crowded, 16 to 18 inches long; side spikes many, weak; flowers  $1\frac{3}{8}$  inch, outer petals azure-blue flushed mauve, inner mauve; eye white. July 4.

MACKAY (Bakers).— $7\frac{1}{2}$  feet; spike somewhat tapering, crowded, 15 to 18 inches long; side spikes many, weak; flowers 2 inches, outer petals deep forget-me-not blue, inner deep mauve; eye white. June 25.

MISS VIOLET GESLIN (Jones).—6 feet; spike somewhat crowded,  $2\frac{1}{2}$  feet long; side spikes many, strong; flowers  $1\frac{1}{2}$  inch, outer petals forget-me-not blue flushed mauve, inner bright mauve; eye white. June 20.

MAJOR PAT A BECKETT (Jones), A.M.—7 feet; spike crowded, 2 to  $2\frac{1}{2}$  feet long; side spikes many, of medium vigour; flowers 2 inches, outer petals bright azure-blue, inner deep mauve; eye white. June 16.

MRS. W. E. WHINERAY (Bakers).— $7\frac{1}{2}$  feet; spike somewhat loose, 2 to  $2\frac{1}{2}$  feet long; side spikes many, strong; flowers 2 inches, outer petals bright azure-blue, inner deep mauve streaked azure-blue; eye white. July 4.

WEYCOURT GEM (Jones), A.M.—6 feet; spike crowded, 12 to 18 inches long; side spikes many, of medium vigour; flowers 2 to  $2\frac{1}{4}$  inches, circular, outer petals azure-blue flushed pale purplish-mauve, inner pale purplish-mauve; eye large, white. June 24.

MRS. A. A. G. CROSS (Jones).— $6\frac{1}{2}$  feet; spike somewhat tapering, crowded, 18 inches long; side spikes many, of medium vigour; flowers  $1\frac{3}{4}$  to  $1\frac{1}{2}$  inch, outer petals azure-blue, inner purplish-mauve; eye white. June 28.

CANDIDAT (Egmond).— $6\frac{1}{2}$  feet; spike somewhat tapering, somewhat loose, 16 to 18 inches long; side spikes many, strong; flowers 2 inches, outer petals azure-blue, inner purplish-mauve; eye white. June 28.

Eye dark.

JUANITA (Jones).—6 feet; spike somewhat crowded, 2 to  $2\frac{1}{2}$  feet long; side spikes many, strong; flowers 2 inches, outer petals pale forget-me-not blue, inner pale mauve, base flushed pale blue; eye brownish. June 23.

SIR ARTHUR PEARSON (Gifford).—6 feet; spike somewhat loose, 2 to  $2\frac{1}{4}$  feet long; side spikes many, strong; flowers  $2\frac{1}{4}$  inches, flat, circular, outer petals pale sky-blue, inner pale mauve, margins tinged bluish; eye brown. July 10.

OVIDUS (Jones).—5 feet; spike somewhat tapering, crowded, 2 feet long; side spikes many, of medium vigour; flowers  $1\frac{1}{2}$  to 2 inches, outer petals deep wedgwood-blue, inner blue flushed pale mauve; eye dark brown. June 28.

MISS NELLIE WEYMAN (Ruys).—7 feet; spike crowded, 2 to  $2\frac{1}{4}$  feet long; side spikes many, strong; flowers  $1\frac{1}{2}$  inch, outer petals bright forget-me-not blue, inner pale mauve, margins tinged blue; anthers greenish. June 23.

AMOS PERRY (Egmond, Jones), H.C.— $6\frac{1}{2}$  feet. Spike somewhat tapering, 2 to  $2\frac{1}{4}$  feet long; side spikes many, strong; flowers 2 inches, pale mauve streaked pale forget-me-not blue; eye dark brown. June 18.

OTHELLO (Bakers).— $6\frac{1}{2}$  feet; spike crowded, 18 to 24 inches long; side spikes many, of medium vigour; flowers  $1\frac{1}{4}$  inch diameter, outer petals forget-me-not blue, inner mauve; eye blackish-brown. June 24.

ADMIRATION (Bakers), A.M.—6 feet; spike blunt, crowded, 18 to 24 inches long; side spikes many, strong; flowers  $2\frac{1}{4}$  inches, cup-shaped, outer petals forget-me-not blue, inner mauve; eye, anthers greenish. June 25.

TOMMY DODD (Jones).—6 feet; spike close, 15 to 20 inches long; side spikes many, weak; flowers  $1\frac{1}{2}$  inch, outer petals forget-me-not blue, inner mauve, margins flushed blue; eye large, dark-brown. July 2.

PEACOCK (Jones).— $7\frac{1}{2}$  feet; somewhat blunt, loose, 2 feet long; side spikes many, weak; flowers  $1\frac{1}{4}$  inch, flat, outer petals deep mauve broadly streaked azure-blue, inner deep mauve; anthers brownish. July 3.

ROBERT COX (Blackmore & Langdon).—7 feet. See JOURNAL R.H.S., vol. 43, p. 476. July 4.

VENETIA (Turner).— $7\frac{1}{2}$  feet; spike somewhat loose,  $2\frac{1}{2}$  feet long; side spikes many, strong; flowers 2 inches, outer petals pale azure-blue, margins and base mauve, inner deep mauve; eye dark brown. July 1.

DR. S. R. WRIGHT (Gifford).—7 feet; spike crowded, 18 to 24 inches long; side spikes many, strong; flowers  $2\frac{1}{4}$  inches, outer petals forget-me-not blue, inner deep mauve; eye large, dark brown. July 10.

THE SHAH (Blackmore & Langdon), H.C.—9 feet; spike somewhat loose,  $2\frac{1}{2}$  to 3 feet long; side spikes many, strong; flowers  $2\frac{1}{4}$  inches, flat, outer petals azure-blue, inner purplish-mauve; eye dark brown. June 30.

*Flowers dark blue and dark mauve.*

AWARDS.

Lord Derby, A.M. July 6, 1925. Raised and sent by Messrs. Blackmore & Langdon.

Mrs. H. Kaye, A.M. June 29, 1925. Raised by Messrs. Wells and sent by Messrs. Blackmore & Langdon and Bakers. (A.M. 1916.)

Wrexham, H.C. July 6, 1925. Raised and sent by Mr. Watkin Samuel of Wrexham.

Pannonia, H.C. June 29, 1925. Sent by Messrs. Ruys. (A.M. 1920.)

F. W. Smith, H.C. July 6, 1925. Raised by Mr. Smith and sent by Messrs. Bakers, Ruys, Jones. (A.M. 1919.)

Peggy, H.C. June 17, 1925. Raised and sent by Messrs. Jones.

SINGLE.

Eye light.

COERULEA (Jones).—7 feet; spike crowded, 2½ feet long; side spikes many, strong; flowers 2 inches, bright azure-blue flushed mauve; eye creamy-white. June 15.

Eye dark.

WREXHAM (Watkin Samuel), H.C.—7 feet; spike somewhat loose; side spikes many, strong; flowers 2½ inches, deep azure-blue, broadly edged mauve; eye large, dark brown. July 2.

SEMI-DOUBLE.

Eye light.

LORD DERBY (Blackmore & Langdon), A.M.—8 feet; spike close, 2 to 2½ feet long; side spikes many, strong; flowers 2 to 2½ inches, purplish-mauve flushed azure-blue; eye small, white. July 1.

PERFECT (Jones).—6 feet; spike tapering, somewhat crowded, 18 inches long; side spikes many, strong; flowers 1½ inch, pale ultramarine-ash with a faint mauve flush; eye white. June 15.

AMYS LEIGH (Jones).—5½ feet; spike crowded, 9 to 15 inches long; side spikes medium, of medium vigour; flowers 1½ inch, outer petals forget-me-not blue flushed pale mauve, inner pale mauve; eye white streaked pale mauve. July 3.

HORACE VERNET (Blackmore & Langdon, Jones).—5 feet; spike somewhat loose, 15 to 16 inches long; side spikes few, weak; flowers 2 to 2½ inches, outer petals bright azure-blue, inner centre mauve, margins azure-blue; eye large, white streaked azure-blue. July 6.

CHARLES (Egmond).—7 feet; spike crowded, 2 to 2½ feet long; side spikes many, strong; flowers 2 inches, outer petals pale azure-blue, margins flushed mauve, inner deep mauve; eye white streaked deep mauve. June 14.

PANNONIA (Ruys), H.C.—5½ feet; spike somewhat crowded, 2 feet long; side spikes many, of medium vigour; flowers 1½ inch, outer petals dull violaceous-blue, inner deep mauve, margins blue; eye white. June 17.

BLUE GLORY (Pudor).—6 feet; spike somewhat blunt, crowded, 18 inches long; side spikes medium, weak; flowers 1½ inch, deep forget-me-not blue flushed mauve; eye white. July 4.

JOSEF ISRAËLS (Ruys).—5½ feet; spike somewhat loose, 18 to 24 inches long; side spikes many, weak; flowers 1½ to 2 inches, azure-blue flushed mauve; eye white. July 3.

F. W. SMITH (Bakers, Ruys, Jones), H.C.—8 feet; spike somewhat loose, 2½ to 3 feet long; side spikes many, strong; flowers 2 inches, bright azure-blue flushed deep mauve; eye white. July 4.

MERCURIUS (Egmond).—6½ feet; spike blunt, somewhat loose, 16 to 18 inches long; side spikes many, of medium vigour; flowers 1½ inch, deep azure-blue flushed deep mauve; eye white streaked deep mauve. July 3.

PROGRESS (Egmond).—6 feet; spike crowded, 2 feet long; side spikes many, weak; flowers 1½ to 2 inches, deep azure blue, margins flushed deep purplish-violet; eye white. June 24.

PEGGY (Jones), H.C.—6 feet; spike somewhat crowded, 18 inches long; side spikes many, of medium vigour; flowers 2 inches, outer petals bright azure-blue, inner purplish-mauve; eye white streaked mauve. June 14.

LORD CURZON (Ruys).—5½ feet. See JOURNAL R.H.S., vol. 43, p. 474. July 1.

MRS. VIOLET HULTON (Bakers, Ruys).—6 feet. See JOURNAL R.H.S., vol. 43, p. 474. June 23.

PRINCE HENRY (Blackmore & Langdon, Jones, Ruys).—6 feet; spike crowded, 18 inches long; side spikes medium, of medium vigour; flowers 2 inches, outer petals azure-blue, inner deep purplish-mauve; eye white. July 2.

Eye dark.

JOSIE (Bakers).—7 feet; spike somewhat crowded, 2 feet long; side spikes many, weak; flowers 1½ inch, deep rosy-mauve, margins tinged azure-blue; anthers greenish-brown. July 4.

CARMEN (Jones).—8½ feet; spike somewhat loose, 2½ to 3 feet long; side spikes medium, of medium vigour; flowers 2 to 2½ inches, outer petals bright azure-blue tinged deep mauve, inner purplish-mauve; eye brownish. June 23.

REV. CHARLES STORR (Bones).— $5\frac{1}{2}$  feet; spike crowded,  $2\frac{1}{2}$  feet long; side spikes few, strong; flowers  $1\frac{3}{8}$  inch, outer petals pale azure-blue, inner pale azure-blue broadly edged mauve; eye brown. June 23.

ALMANA FERN (Jones).— $5\frac{1}{2}$  feet; spike somewhat tapering, crowded,  $1\frac{1}{2}$  to 2 feet long; side spikes many, weak; flowers  $1\frac{3}{8}$  inch, outer petals pale dull violaceous-blue, inner mauve; anthers brownish. June 22.

LEGIONNAIRE (Blackmore & Langdon).—6 feet; spike tapering, somewhat loose,  $1\frac{1}{2}$  to 2 feet long; side spikes few, weak; flowers 2 inches, deep azure-blue flushed mauve; eye dark brown. July 2.

RENÉ GUILBERT (Blackmore & Langdon).—7 feet; spike somewhat loose, 2 to  $2\frac{1}{2}$  feet long; side spikes many, strong; flowers 2 inches, outer petals bright azure-blue, inner azure-blue flushed mauve; eye dirty brown. July 13.

TURQUOISE (Egmond).—7 feet. See JOURNAL R.H.S., vol. 43, p. 475. June 23.

STRADA (Egmond).— $5\frac{1}{2}$  feet; spike crowded, 2 to  $2\frac{1}{2}$  feet long; side spikes many, strong; flowers 2 inches, outer petals dull azure-blue, inner purplish-mauve; eye brown. June 23.

CHAMUD (Ruys).—4 feet. See JOURNAL R.H.S., vol. 43, p. 474. June 24.

MRS. H. KAYE (Blackmore & Langdon, Bakers), A.M.—8 feet; spike somewhat close,  $2\frac{1}{2}$  to 3 feet long; side spikes many, strong; flowers 2 inches, outer petals bright azure-blue, inner violet-purple base flushed azure-blue; eye streaked brown. June 22.

#### DOUBLE.

LADY JANE (Harwood).—7 feet; spike somewhat loose,  $1\frac{1}{2}$  foot long; side spikes many, of medium vigour; flowers  $1\frac{3}{8}$  inch, pale gentian-blue tinged violet; eye large, white streaked violet-blue. July 1.

#### *Flowers violet and purple shades.*

#### AWARDS.

Violet Queen, A.M. July 6, 1925. Raised and sent by Mr. Watkin Samuel.

Edward Bromet, A.M. July 6, 1925. Raised and sent by Messrs. Blackmore & Langdon.

King of Delphiniums, A.M. June 29, 1925. Sent by Messrs. Jones, Ruys, Forbes, Egmond.

Mrs. Creighton, A.M. June 29, 1925. Raised by Mr. Heemerik and sent by Messrs. Ruys.

Rev. E. Lascelles, A.M. July 6, 1925. Raised by Mr. Walters and sent by Messrs. Blackmore & Langdon, Jones, Ruys, Forbes. (A.M. 1907.)

Prince of Wales, H.C. June 29, 1925. Raised by Mr. Koppius and sent by Messrs. Egmond.

Sven Ridder, H.C. June 29, 1925. Raised and sent by Messrs. Ruys.

Novelty, H.C. June 29, 1925. Raised by Messrs. Blackmore & Langdon and sent by Messrs. Blackmore & Langdon and Ruys.

Purple Emperor, H.C. June 29, 1925. Raised and sent by Messrs. Trinder of Fleet.

#### SINGLE.

Eye dark.

VIOLET QUEEN (Watkin Samuel), A.M.—8 feet; spike somewhat crowded,  $2\frac{1}{2}$  to 3 feet long; side spikes many, strong; flowers  $2\frac{1}{4}$  inches, deep gentian-blue, margins broadly edged purple; eye blackish-brown. July 1.

#### SEMI-DOUBLE.

Eye light.

ELSIE BLACK (Forbes).—7 feet; spike somewhat loose, 2 to  $2\frac{1}{2}$  feet long; side spikes many, strong; flowers 2 inches, pale ultramarine-ash flushed deep dull purplish-mauve; eye white. July 3.

THE ALAKE (Blackmore & Langdon, Ruys, Jones).— $7\frac{1}{2}$  feet. See JOURNAL R.H.S., vol. 43, p. 475. June 26.

GEORGE COCHRANE (Blackmore & Langdon).—7 feet; spike somewhat loose, 2 to  $2\frac{1}{2}$  feet long; side spikes many, strong; flowers  $2\frac{1}{4}$  inches, flat, outer petals deep azure-blue flushed purplish-mauve, inner deep purplish-mauve; eye white. July 8.

PRINCE OF WALES (Egmond), H.C.—7 feet; spike crowded,  $2\frac{1}{2}$  feet long; side spikes many, of medium vigour; flowers 2 to  $2\frac{1}{4}$  inches, outer petals bright azure-blue, inner purplish-violet, tinged azure-blue; eye white. June 24.

DE RUYTER (Ruys).—5 feet. See JOURNAL R.H.S., vol. 43, p. 474. June 25.

EDWARD BROMET (Blackmore & Langdon), A.M.—7 feet; spike crowded, 2 feet long; side spikes many, of medium vigour; flowers 2 inches, flat, outer

petals deep azure-blue, margins flushed purple, inner purplish-blue; eye large, white. June 24.

WM. KELLY (Jones).—6½ feet; spike somewhat crowded, 12 inches long; side spikes many, weak; flowers 1½ inch, outer petals azure-blue flushed violet, inner violet-purple; eye white. June 23.

THE MOOR (Gifford).—6 feet; spike crowded, 2 feet long; side spikes many, strong; flowers 2 to 2½ inches, outer petals azure-blue flushed violet, inner violet-purple; eye white. July 29.

PHINEAS (Turner).—5 feet; spike crowded, 12 to 16 inches long; side spikes few, weak; flowers 1½ inch, outer petals gentian-blue, inner violet-purple; eye white. July 1.

SVEN RIDDER (Ruys), H.C.—5½ feet; spike somewhat tapering, crowded, 18 to 20 inches long; side spikes medium, strong; flowers 2 inches, outer petals azure-blue edged violet, inner deep violet-purple; eye large, cream streaked violet. June 16.

KING OF DELPHINIUMS (Jones, Ruys, Forbes, Egmond), A.M.—6 feet; spike crowded, 2 to 2½ feet long; side spikes many, strong; flowers 2 to 2½ inches, outer petals bright azure-blue, inner deep purplish-violet; eye large, creamy-white. June 23.

FRANÇOIS NAGELS (Ruys).—4½ feet; spike somewhat loose; 12 to 16 inches long; side spikes few, weak; flowers 1¾ inch, outer petals azure-blue edged deep violet, inner deep violet-purple; eye white. July 3.

DOREEN (Turner).—6½ feet; spike tapering, somewhat loose, 2 feet long; side spikes many, strong; flowers 1¾ inch, outer petals azure-blue edged violet, inner deep violet; eye white. July 2.

Eye dark.

RENÉ GILBERT (Jones, Gifford).—7½ feet; spike somewhat loose, 2½ feet long; side spikes many, strong; flowers 2 inches, outer petals bright gentian-blue, inner bluish-purple; eye dull grey-brown. July 10.

MRS. CREIGHTON (Ruys), A.M.—6 feet; spike somewhat tapering, crowded, 15 to 18 inches long; side spikes many, of medium vigour; flowers 2 inches, outer bright azure-blue, inner violet-mauve; eye brownish. June 15.

NOVELTY (Blackmore & Langdon, Ruys), H.C.—7 feet; spike somewhat loose, 2½ to 2¾ feet long; side spikes many, strong; flowers 2 inches, outer petals bright azure-blue, inner bright violet-purple; eye large, deep brown. June 24.

PURPLE KING (Blackmore & Langdon).—6½ feet; spike loose, 1½ to 2 feet long; side spikes many, weak; flowers 2 inches, outer petals azure-blue, margins flushed mauve, inner pale violet-mauve; eye dark brown. June 23.

PRINCESS JULIANA (Ruys, Forbes).—6 feet. See JOURNAL R.H.S., vol. 43, p. 476. June 23.

JULIANA (Egmond).—Similar to 'Princess Juliana.'

PURPLE EMPEROR (Trinder), H.C.—8 feet; spike somewhat crowded, 2½ feet long; side spikes many, strong; flowers 1¾ to 2 inches, outer petals bright azure-blue, inner pale violet-purple tinged azure-blue; eye dark brown. June 22.

MISS B. GARBUTT (Egmond).—7 feet; spike somewhat loose, 2 to 2½ feet long; side spikes many, strong; flowers 1¾ inch, violet-purple tinged deep azure-blue; eye brown. July 3.

ZUSTER LUGTEN (Jones, Egmond, Ruys).—7 feet. See JOURNAL R.H.S., vol. 43, p. 476. July 3.

PRINCE GUSTAV (Bakers, Forbes, Ruys).—7 feet; spike crowded, 1½ foot long; side spikes few, weak; flowers 1¾ inch, flat, violet-mauve, margins flushed deep azure-blue; eye brown. July 3.

DUSKY MONARCH (Ruys, Jones, Forbes).—6½ feet. See JOURNAL R.H.S., vol. 43, p. 475. July 1.

SIR DOUGLAS HAIG (Blackmore & Langdon, Jones).—7½ feet; spike somewhat loose, 1½ to 2 feet long; side spikes few, strong; flowers 2½ to 2¾ inches, outer petals deep azure-blue, margins deep mauve, inner deep purplish-mauve; eye dark brown. July 6.

DOUBLE.

Eye light.

REV. E. LASCELLES (Blackmore & Langdon, Jones, Ruys, Forbes), A.M.—6½ feet; spike somewhat loose, 2 to 2½ feet long; side spikes many, of medium vigour; flowers 2 inches, outer petals azure-blue, inner pale violet-purple; eye large, white streaked violet-purple. July 1.

Eye dark.

KING BLADUD (Blackmore & Langdon).—6½ feet. See JOURNAL R.H.S., vol. 43, p. 477. July 4.

## DAHLIAS AT WISLEY, 1925.

THE trials of Dahlias were continued at Wisley on the same lines as for some years past, new varieties selected at Vincent Square by the Joint R.H.S. and National Dahlia Society Committee being grown side by side with the varieties which had already received awards in these trials.

The site was the same as that on which the Dahlias have been grown heretofore, the only preparation of the soil being deep digging without the addition of manure. In spite of the absence of manure, the plants grew perhaps rather taller than is normal and provided a fine spectacle in August, September, and early October. They were destroyed by frost rather early in October.

Awards recommended this year by the Joint Committee are shown in the following notes, which, however, omit all mention of the plants grown as standards of comparison to which awards have been made in earlier years. Descriptions of these will be found in earlier reports.

## AWARDS, DESCRIPTIONS, AND NOTES.

*Class I. SINGLE DAHLIAS.*

## AWARD.

*Aimée Barillet*, A.M. August 31, 1925. Sent by Mr. E. A. Bowles, raised by Messrs. Rivoire. (H.C. 1922.)

*AIMÉE BARILLET* (Bowles), A.M.—See JOURNAL R.H.S., 48, p. 99.

*Class II. MIGNON SINGLE DAHLIAS.**Rose-pink.*

*PINK COLTNESS GEM* (Dobbie).—2½ feet. Flowers 3 to 3½ inches diameter; dull rose-pink, fades somewhat; stalks erect, 6 to 10 inches long; free. Raised by Messrs. Watkins & Simpson.

*Class III. COLLERETTE DAHLIAS.*

## AWARD.

*Lady le Bas*, A.M. August 31, 1925. Raised and sent by Messrs. Cheal of Crawley.

*Rose-crimson.*

*MRS. EUSTACE BERRY* (Cheal).—5 feet. Flowers 3½ to 4 inches diameter; rich rosy-crimson, collar white irregularly streaked rosy-crimson; free, on erect 9- to 14-inch stalks.

*Crimson-maroon.*

*LADY LE BAS* (Cheal), A.M.—5½ feet. Flowers 4 inches diameter; deep crimson-maroon, collar white flushed crimson-maroon; stalks erect, 9 to 14 inches long; free.

*Class V. PEONY-FLOWERED DAHLIAS.*

## AWARDS.

*Flame*, A.M. August 31, 1925. Raised and sent by Messrs. Burrell of Cambridge.

*Mrs. Skevington*, A.M. August 31, 1925. Raised and sent by Mr. A. J. Cobb of Reading University College.

*Lady Heath*, A.M. August 31, 1925. Raised and sent by Messrs. Cheal.

*Mrs. W. R. Dykes*, H.C. August 31, 1925. Raised and sent by Messrs. Cheal.

*Yellow.*

WAGTAIL (Stredwick).—6 feet. Flowers 5 to 6 inches diameter; pale lemon-yellow, broadly tipped white; not carried above foliage; stalks erect, 12 inches long; free.

*Orange-scarlet.*

FLAME (Burrell), A.M.—4½ feet. Flowers 4½ to 6 inches diameter; bright orange suffused scarlet; well above the foliage; free, on 10- to 18-inch erect stalks.

*Pink.*

ATTENTION (Burrell).—4 feet. Flowers 5 to 6 inches diameter; white, flushed pale rose, base darker; stalks erect, 6 to 8 inches long; free.

MRS. W. R. DYKES (Cheal), H.C.—5½ feet. Flowers 4 to 5 inches diameter; bright tyrian-pink; well above foliage; stalks erect, 6 to 12 inches long; free.

*Pink on yellow.*

MRS. SKEVINGTON (Cobb), A.M.—5 feet. Flowers 4 to 5 inches diameter; amaranth-pink on orange, base shaded orange; well above foliage; free, on erect 12-inch stalks.

*Mauve.*

LADY HEATH (Cheal), A.M.—6 feet. Flowers 4 to 5½ inches diameter; pale rosolane-purple; well above foliage; stalks erect, 12 to 16 inches long; free.

Class VI. SMALL-FLOWERED PÆONY-FLOWERED DAHLIAS.

AWARDS.

LUCINA, A.M. September 28, 1925. Raised and sent by Messrs. Burrell.

CATHE, A.M. September 28, 1925. Raised and sent by Messrs. Burrell.

ATALANTA, A.M. August 31, 1925. Raised and sent by Messrs. C. Turner of Slough.

MRS. A. GORDON, A.M. August 31, 1925. Raised and sent by Messrs. J. Cheal.

MARY POYNTER, A.M. August 31, 1925. Raised and sent by Messrs. Treseder of Cardiff.

MOLLY, A.M. August 31, 1925. Raised and sent by Messrs. Burrell.

NIGRA, A.M. August 31, 1925. Raised and sent by Mr. Cobb.

GLAMOUR, A.M. August 31, 1925. Raised and sent by Messrs. Burrell.

ST. DAVIDS, A.M. August 31, 1925. Raised and sent by Mr. Cobb.

MARY, A.M. September 28, 1925. Raised and sent by Messrs. Burrell.

MURIEL, H.C. August 31, 1925. Raised and sent by Messrs. Burrell.

HARRIET, H.C. September 28, 1925. Raised and sent by Messrs. Burrell.

TANSY, H.C. September 28, 1925. Raised and sent by Messrs. Burrell.

WESSEX, H.C. September 28, 1925. Raised and sent by Mr. Cobb.

*Orange and scarlet.*

LUCINA (Burrell), A.M.—4½ feet. Flowers 4 inches diameter; orange-scarlet, tips suffused orange, fades somewhat; stalks erect, 6 to 10 inches long; free.

FANCIFUL (Burrell).—5 feet. Flowers 3½ to 4½ inches diameter; coppery-orange, suffused scarlet, fades much; free, on erect 6- to 9-inch stalks.

*Pink on yellow.*

CATHE (Burrell), A.M.—5 feet. Flowers 3½ to 4½ inches diameter; pale rose-pink on lemon-yellow ground, base suffused lemon-yellow; stalks erect, 6 to 12 inches long; free.

ATALANTA (Turner), A.M.—5 feet. Flowers 3½ to 4 inches diameter; amaranth-pink on yellow ground, suffused crimson-buff at base; free, on erect 6- to 10-inch stalks.

MRS. A. GORDON (Cheal), A.M.—5½ feet. Flowers 3 to 3½ inches diameter; tips amaranth-pink on yellow shading to buff, base flushed crimson; stalks 10 to 14 inches long, erect, free; well above foliage.

IRINA (Burrell).—5½ feet. Flowers 3 to 3½ inches diameter; bright rose, base suffused crimson; free, on erect 10- to 13-inch stalks.

PATTIE (Burrell).—4½ feet. Flowers 3½ to 4½ inches diameter; pale rose-pink on yellow ground, crimson zone at base; neck weak; stalks somewhat drooping, 6 to 10 inches long; free.

MURIEL (Burrell), H.C.—4 $\frac{3}{4}$  feet. Flowers 3 to 4 inches diameter; bright amaranth-pink on deep yellow, base golden yellow; free; stalks erect, 12 inches long.

HARRIET (Burrell), H.C.—4 $\frac{1}{2}$  feet. Flowers 3 to 3 $\frac{1}{2}$  inches diameter; bright salmon-rose on lemon-yellow ground, fades somewhat; stalks erect, 6 to 10 inches long; free.

EMMELINE (Burrell).—5 feet. Flowers 3 $\frac{1}{2}$  to 4 inches diameter; pale salmon-rose on pale yellow ground; stalks 10 to 12 inches long, erect; free.

AMY (Burrell).—5 feet. Flowers 4 to 4 $\frac{1}{2}$  inches diameter; bright rose-red on yellow, shading to pale rose-pink; free, on erect 6- to 9-inch stalks.

*Rose on yellow.*

HOSEA (Burrell).—4 feet. Flowers 3 $\frac{1}{2}$  to 4 $\frac{1}{2}$  inches diameter; bright rosy-red, tips paler, base suffused orange-scarlet; stalks 9 to 12 inches long, free, erect.

MARY POYNTER (Treseder), A.M.—4 feet. Flowers 3 $\frac{1}{2}$  inches diameter; bright rosy-cerise on yellow, tips paler, base darker; free, on erect 12- to 14-inch stalks.

MOLLY (Burrell), A.M.—5 $\frac{1}{2}$  feet. Flowers 3 $\frac{1}{2}$  to 4 $\frac{1}{2}$  inches diameter; bright rosy tyrian-pink, suffused yellow at base; stalks 8 to 14 inches long, erect; free.

*Purplish-crimson.*

TANSY (Burrell), H.C.—5 $\frac{1}{4}$  feet. Flowers 4 to 4 $\frac{1}{2}$  inches diameter; purplish-crimson, tips fade; free, on erect 12- to 16-inch stalks.

NIGRA (Cobb), A.M.—5 $\frac{1}{4}$  feet. Flowers 4 inches diameter; purplish-crimson, fades; stalks erect, 6 to 14 inches long; free; carried well above foliage.

*Scarlet.*

GLAMOUR (Burrell), A.M.—5 $\frac{1}{2}$  feet. Flowers 3 $\frac{1}{2}$  to 4 $\frac{1}{2}$  inches diameter; bright scarlet; stalks erect, 10 to 18 inches long; free; carried well above foliage.

EUDORA (Burrell).—5 $\frac{1}{2}$  feet. Flowers 4 to 4 $\frac{1}{2}$  inches diameter; bright clear scarlet; free, on erect 12- to 15-inch stalks.

GWENDOLINE (Treseder).—4 feet. Flowers 3 $\frac{1}{2}$  to 4 inches diameter; deep rosy-scarlet, fades; stalks erect, 6 to 9 inches long; free.

*Crimson.*

ST. DAVIDS (Cobb), A.M.—5 feet. Flowers 3 to 3 $\frac{1}{2}$  inches diameter; deep crimson; free, on erect 6- to 10-inch stalks; carried well above foliage.

WESSEX (Cobb), H.C.—4 feet. Flowers 4 inches diameter; deep crimson; stalks erect, 9 to 12 inches long; free; carried well above foliage.

ELATOR (Burrell).—4 $\frac{1}{2}$  feet. Flowers 4 to 4 $\frac{1}{2}$  inches diameter; deep scarlet-crimson, fades somewhat; stalks erect, 10 to 14 inches long; free.

*Maroon.*

MARY (Burrell), A.M.—5 $\frac{1}{2}$  feet. Flowers 4 to 4 $\frac{1}{2}$  inches diameter; deep maroon; free, on erect 10- to 15-inch stalks; carried well above foliage.

*Class VII. DWARF PEONY-FLOWERED DAHLIAS.*

OMAR (Burrell).—3 $\frac{1}{4}$  feet. Flowers 4 to 5 inches diameter; bright orange flushed scarlet; free, on erect 6- to 12-inch stalks.

*Class VIII. DECORATIVE DAHLIAS.*

AWARDS.

Prestige, A.M. August 31, 1925. Raised and sent by Messrs. J. Stredwick of St. Leonards-on-Sea.

Mevrouw Enschedé Kooy, A.M. September 28, 1925. Raised and sent by Mr. Carlée, Holland.

Emma Groot, A.M. August 31, 1925. Raised and sent by Messrs. Ballego, Holland.

Uncle Dick, A.M. August 31, 1925. Raised and sent by Messrs. Stredwick.

Jean, A.M. August 31, 1925. Raised and sent by Messrs. Burrell.

Reginald Godfrey, A.M. September 28, 1925. Raised and sent by Messrs. Godfrey of Exmouth.

Border Perfection, A.M. September 28, 1925. Raised and sent by Messrs. Bruidegom, Holland.

Sheila Ward, H.C. August 31, 1925. Raised and sent by Messrs. Stredwick.



*White.*

MENNY CARLÉE (Carlée).—4½ feet. Flowers 6 to 7 inches diameter; white, centre of a creamy shade; stalks erect, 9 to 12 inches long; free. Flowering from August 20.

*Yellow.*

SHEILA WARD (Stredwick), H.C.—6 feet. Flowers 6 to 7 inches diameter; pale lemon-yellow, broadly tipped white; just above foliage; stalks erect, 6 to 9 inches long; free.

*Old gold.*

PRESTIGE (Stredwick), A.M.—4 feet. Flowers 6 to 7 inches diameter; old gold, centre darker; well above foliage; stalks erect, 10 inches long; free.

WEMBLEY (Stredwick).—6½ feet. Flowers 6 to 7 inches diameter; old gold flushed bronzy terra-cotta, centre paler; not carried above foliage; stalks erect, 6 inches long; free.

*Apricot.*

MEVROUW ENSCHEDÉ KOOY (Carlée), A.M.—5¾ feet. Flowers 6 inches diameter; apricot, flushed pale terra-cotta; stalks 12 to 16 inches long, erect; free. Flowering from August 20.

*Pink on yellow.*

SECRETARY VOORS (Ballego).—6½ feet. Flowers 5 inches diameter; pale amaranth-pink on pale yellow; free, on erect 12- to 16-inch stalks.

*Pink.*

KITTY ROGERS (Stredwick).—6 feet. Flowers 6 to 8 inches diameter; white flushed pale amaranth-pink, centre much paler; stalks 6 to 10 inches long, erect; free.

MR. JOH. DIX (Carlée).—5 feet. Flowers 4½ to 5 inches diameter; rose-pink free, on erect 6- to 12-inch stalks.

*Mauve.*

EMMA GROOT (Ballego), A.M.—6 feet. Flowers 6 to 7 inches diameter; light mallow-purple; stalks erect, 12 inches long; free; carried well above foliage.

MRS. E. WADDINGHAM (Urquhart).—6 feet. Flowers 4½ to 6 inches diameter; mallow-purple; not carried above foliage; free, on somewhat drooping 6- to 10-inch stalks. Flowering from August 28.

*Orange-scarlet.*

UNCLE DICK (Stredwick), A.M.—4 feet. Flowers 5 to 6 inches diameter; orange-scarlet, broadly tipped white; free, on erect 6- to 10-inch stalks.

*Scarlet.*

JEAN (Burrell), A.M.—5 feet. Flowers 6 to 8 inches diameter; rich scarlet; carried well above foliage; stalks erect, 6 to 10 inches long; free.

JOH. MENSING (Topsvoort).—4½ feet. Flowers 5 to 5½ inches diameter; rich crimson-scarlet; free, on erect 6- to 12-inch stalks.

*Crimson.*

REGINALD GODFREY (Godfrey), A.M.—5½ feet. Flowers 6 to 7 inches diameter; rich crimson; free, on erect 6- to 7-inch stalks.

BORDER PERFECTION (Bruidgom), A.M.—See JOURNAL R.H.S., 49, p. 65.

*Maroon.*

FRED RAMSOME (Stredwick).—5½ feet. Flowers 6 to 7 inches diameter; deep maroon, not carried above foliage; stalks erect, 6 to 12 inches long; free. Flowering from August 22.

Class IX. SMALL-FLOWERED DECORATIVE DAHLIAS.

AWARDS.

May, A.M. August 31, 1925. Raised and sent by Messrs. W. Treseder.

Persis, A.M. August 31, 1925. Raised and sent by Messrs. Burrell.

Freda, A.M. September 28, 1925. Raised and sent by Messrs. Burrell.

*Pink on yellow.*

MAY (Treseder), A.M.—4½ feet. Flowers 3½ to 4 inches diameter; amaranth-pink on yellow, centre darker; carried well above foliage; very free, on erect 8- to 15-inch stalks.

PERSIS (Burrell), A.M.—4 feet. Flowers 3½ to 4 inches diameter; light mallow-purple on yellow; stalks erect, 6 to 10 inches long; free.

*Maroon.*

FREDA (Burrell), A.M.—4½ feet. Flowers 4 inches diameter; deep velvety maroon; stalks 6 to 7 inches long, erect; free.

## Class XI. CAMELLIA-FLOWERED DAHLIAS.

## AWARD.

ULICK, A.M. August 31, 1925. Raised and sent by Messrs. Cheal.

*White flushed rose.*

PRUDENCE (Burrell).—5 feet. Flowers 4 inches diameter; ivory white centre faintly flushed pale rose, carried just above foliage; stalks erect, 9 inches long; free.

*White flushed mallow-purple.*

ULICK (Cheal), A.M.—4½ feet. Flowers 3½ inches diameter; white lightly flushed mallow-purple, centre darker; stalks erect, 6 to 9 inches long; free.

*Old gold.*

SUNSTAR (Burrell).—4½ feet. Flowers 4 to 5 inches diameter; old gold; stalks erect, 12 inches long; free.

## Class XIV. STAR DAHLIAS.

## AWARDS.

Crimson Star, A.M. August 31, 1925. Raised and sent by Messrs. Cheal. (H.C. 1923.)

Charlwood Star, H.C. August 31, 1925. Raised and sent by Messrs. Cheal.

Highmead Star, H.C. August 31, 1925. Raised and sent by Messrs. Cheal.

Shinfield Star, H.C. August 31, 1925. Raised and sent by Mr. Cobb.

*Orange.*

DOROTHY CARLILL (Brousson).—4 feet. Flowers 3 inches diameter; orange, tipped amaranth-pink; free, on erect 12-inch stalks. Flowering from August 20.

CHARLWOOD STAR (Cheal), H.C.—4½ feet. Flowers 3 to 3½ inches diameter; orange-scarlet, base orange; stalks erect, 9 to 12 inches long; free.

*Pink on yellow.*

HIGHMEAD STAR (Cheal), H.C.—4 feet. Flowers 3 to 3½ inches diameter; light mallow-purple shading to tyrian-pink on yellow at base; free, on erect 9- to 14-inch stalks.

SALMON STAR (Cheal).—4½ feet. Flowers 2½ to 3 inches diameter; rich salmon-pink on yellow; carried just above foliage; free, on erect 6- to 9-inch stalks.

*Pink.*

PETWORTH STAR (Cheal).—5 feet. Flowers 2½ to 3 inches diameter; tyrian-pink base suffused deep crimson; stalks 9 to 13 inches long, erect; free.

BURSTOW STAR (Cheal).—4 feet. Flowers 3 inches diameter; rich mallow-purple, deep crimson-maroon zone at base; free, on erect 10-inch stalks.

*Orange-scarlet.*

SHINFIELD STAR (Cobb), H.C.—4 feet. Flowers 3 inches diameter; rosy-cerise, deepening to orange-scarlet; stalks erect, 6 to 9 inches long; free.

*Crimson.*

RUSPER STAR (Cheal).—4½ feet. Flowers 3 inches diameter; scarlet-crimson tipped deep amaranth-pink; stalks 6 to 9 inches long, erect; free.

CRIMSON STAR (Cheal), A.M.—See JOURNAL R.H.S., 48, p. 105.

Class XV. CACTUS DAHLIAS.

DOUBLE CACTUS.

AWARDS.

Mrs. Lowes, A.M. September 28, 1925. Raised and sent by Messrs. Cheal.

Princess Louise, A.M. August 31, 1925. Raised and sent by Messrs. Stredwick.

Berengaria, A.M. September 28, 1925. Raised and sent by Messrs. Stredwick.

Acme, H.C. September 28, 1925. Raised and sent by Mr. H. Shoesmith, jun., of Woking.

*White.*

ALICE AMOS (Stredwick).—6 feet. Flowers 5 to 6 inches diameter; white, base greenish, petals broadly quilled; stalks erect, 6 inches long; free; carried above foliage. Flowering from August 28.

SNOW BUNTING (Stredwick).—6½ feet. Flowers 6 inches diameter; white, base greenish; stalks erect, 9 inches long; free; carried well above foliage. Flowering from August 28.

*Yellow.*

MRS. LOWES (Cheal), A.M.—See JOURNAL R.H.S., 49, p. 66.

BERENGARIA (Stredwick), A.M.—5½ feet. Flowers 6 to 8 inches diameter; orange-yellow with a faint bronzy tinge, petals broad; stalks erect, 6 to 9 inches long; free. Flowering from August 23.

*Pink on white.*

PRINCESS LOUISE (Stredwick), A.M.—6 feet. Flowers 6 to 6½ inches diameter; rich mallow-purple on white, petals broadly quilled; stalks somewhat drooping, 12 inches long; free. Flowering from August 27.

*Pink and yellow.*

ACME (Shoesmith), H.C.—5½ feet. Flowers 5 to 6 inches diameter; bright yellow at base, shading to carmine-pink at tips; carried well above foliage; stalks erect, 10 inches long; free. Flowering from August 14.

*Old gold flushed red.*

CHRISTINE PRIOR (Stredwick).—6 feet. Flowers 6 to 7 inches diameter; old gold flushed terra-cotta, centre paler, base old gold; stalks somewhat drooping, 6 to 10 inches long; free; only just above foliage. Flowering from August 23.

MARY SPARKES (Stredwick).—6 feet. Flowers 6 to 7 inches diameter; yellowish buff, faintly streaked and flushed rosy-red; not above foliage; free, on erect 6- to 14-inch stalks. Flowering from August 24.

*Rose-magenta.*

RING-OUZEL (Stredwick).—6 feet. Flowers 6 to 8 inches diameter; deep rose-magenta; only just above foliage; stalks erect, 6 to 10 inches long; somewhat sparse in flowering. Flowering from August 24.

*Red.*

LADY YOUNG (Cheal).—6½ feet. Flowers 6 inches diameter; rich spectrum-red; carried above foliage; free, on erect 6- to 10-inch stalks. Flowering from August 28.

*Red on yellow.*

ROMEO (Stredwick).—6½ feet. Flowers 6 to 7 inches diameter; pale dull red on yellow, thickly streaked and dotted dull crimson; free, on erect 6- to 12-inch stalks, but only just above foliage. Flowering from August 25.

## COS LETTUCES AT WISLEY, 1918-24.

### WITH A NOTE ON THE CLASSIFICATION OF THE GROUP.

THE last trial of Lettuces for summer use took place in 1919, and in the reports upon that trial (see this JOURNAL, vol. 45, pp. 334-353) an attempt was made to classify the varieties grown in such a way as to make their characteristics clear and to bring together the forms which were most alike. The report showed that Lettuces could be divided into four main groups :

1. The Cutting or Bunching Lettuces which form no hearts, and from which leaves can be cut at frequent intervals for use in salads ;
2. The Cabbage Lettuces which make a heart about as broad as long, and which may be either crisp or buttery in flavour ;
3. The Semi-Cos Lettuces of compact habit and with rather small oblong hearts about intermediate between the Cabbage and Cos varieties ; and
4. The Cos Lettuces with large crisp hearts and broad midribs to the long usually spatulate leaves.

Of the 280 stocks grown in 1919 only about 70 belonged to Classes 3 and 4, and although the trial gave a good idea of variations found in the Cos Lettuce types yet it was less complete and informative than the trial of Cabbage Lettuces in that year proved to be, and it was therefore determined to make the present trial upon Cos and Semi-Cos varieties alone.

Cos Lettuces are still in demand, although they are gradually being superseded by Cabbage Lettuces even in the large markets, as consumers discover the quality of the Cabbage varieties, and growers their many merits from a grower's point of view. The report referred to will give all available information concerning the best varieties of the Cabbage Lettuce group to grow, and the value of the same group for cultivation in the open for spring use is discussed in the reports on winter Lettuces which appeared in vol. 45, pp. 354-359, and vol. 49, pp. 255-261.

Cos Lettuces are, perhaps, better suited to moist mild climates than to hot dry ones. They mature somewhat more slowly than Cabbage varieties (in some cases much more slowly), usually bolt more quickly, and often need tying to secure good hearts. On the other hand they are usually more crisp than Cabbage varieties, and for this reason will probably still be in demand for summer use.

In the present trial a much greater range of varieties was got together than in 1919, not only from English but also from foreign sources. One hundred and ninety-eight stocks in all were grown.

Two proved to be Cabbage varieties sent in by mistake, and these are not further referred to. Of the remainder some varieties, as will be seen, were fit only for autumn-sowing and either failed entirely to mature, or, if they matured, were either so slow or bolted so quickly upon maturity that they were useless. These varieties are mentioned in the notes below, but in some cases no adequate description was possible since maturity was not reached.

The seed of all varieties was sown upon April 7, 1924, and one row of plants of each variety was allowed to remain where it was sown and thinned to the proper distance apart, a second row being transplanted from it and grown side by side with the sown row. The transplanting was done in every variety on May 5, 1924. The plants which were not transplanted matured about ten days earlier than those transplanted, but there was no difference between the two rows in the subsequent rate of bolting. The ground on which the plants were grown carried a crop of marrows and beans in 1923. The plants grew well without a check, good plants being produced by almost every stock. The rainfall was sufficient and in marked contrast with that of the last summer trial, as is shown below :

	April.	May.	June.	July.		
1919 .	2.48	0.24	1.17	2.66 in.	=	6.55 in.
1924 .	3.48	3.17	3.06	7.12 „	=	16.83 „

On the whole, the stocks tried were very true to type, and reflect credit upon those responsible for the growing of the seeds. This is, to a great extent, shown by the awards made, and it may safely be assumed that any stock to which an award was made in this trial would give a good account of itself in any properly cultivated garden in the country. Requirements and tastes differ in different gardens, and it should be easy for the grower who knows what he wants to select from the stocks to which awards have been made the variety which best suits his requirements. Size, rate of growth, time of maturity, colour, to a certain extent flavour, the rate of running to seed—or, in other words, the time a variety will “stand”—all vary, and notes upon each of these characteristics are given below.

For small gardens and for private use the small and medium-sized long-standing Lettuces will probably be found most useful ; for larger gardens, the medium-sized varieties ; for market, the early maturing, self-folding, and darker green varieties ; for exhibition, too often the very large varieties, which are, however, as a rule excellent for cooking.

In classifying the varieties no one character alone can be used, but all salient features need to be taken into account ; characters shown not only at maturity but from the seedling stage upwards are of value, and in some cases are essential in differentiating between one variety and another.

It should be noted that awards are made to particular stocks. A variety may be represented in the trial by a large number of stocks, and the stocks may differ from one another especially in the degree

in which the essential features of the variety are developed—that is, in regularity. To the most regular alone will the award be given, and the awards are therefore not only a guide as to varieties worth growing, but also to the best stocks of those varieties, and this should be borne in mind in consulting the report.

In the annotated list which follows it will be found that many varieties appear under several names. Where this is the case an endeavour has been made to select the name most commonly in use, and to mention the other names used for that variety under it. The ideal would be to preserve the name originally given to the variety, but unfortunately the earliest name is frequently changed and a later name becomes better known. It is desirable that these changes should not be made, but it is even more desirable that each variety should be known by one name only, and it is hoped that the methods of classification which we are adopting in these reports will have some effect in bringing about this result. It should at least prevent the grower from purchasing one variety under several different names under the false impression that each name means a different variety.

Extraordinary care is necessary in order to maintain the highest standard of a variety, and occasionally in the hands of seed growers new to the work this need is not sufficiently recognized and inferior stocks and sometimes stocks so much deteriorated as to be untrue are put upon the market. The practice of our leading seedsmen of maintaining purity by rigorous selection for the production of stock seed is the best method of maintaining the highest standard, but this practice was unfortunately interfered with by the war and stocks in some cases deteriorated.

In many instances it will be found that around one central type numbers of sub-varieties may be grouped, and these sub-varieties have arisen to some extent at least because in France, where most of the seed of Lettuce was at one time grown, great attention is devoted to Lettuce as well as to some other salad plants, and every district has selected a form out of the principal types, and, by rigid elimination of those plants which do not conform to their local ideal, has obtained a sub-variety out of the original type variety. This will be found well illustrated under 'Paris White.' A somewhat similar cause of small variations from a type arises from selection passing into the hands of a novice in the particular variety. At its worst, the variation from the type is irregular, owing either to the conditions of cultivation preventing proper selection, to neglect of selection at the proper period of growth, or to neglect to eliminate undesirable seed parents at all.

As a consequence, it not infrequently happens that the stock received under a certain name differs materially from that to which this name was originally applied, and is one to which another name really belongs or (rarely) a new form which ought to receive a new name. So involved therefore does the nomenclature become that it is perhaps necessary to establish afresh our standards of what a variety ought to be, and we put forward the notes which follow with this reservation.

We are, it is to be remembered, dealing solely with the very considerable number of stocks which have reached us for trial from 1918 to the present time, and it will be found that our grouping of synonyms differs materially from that given by Mr. LISTER MORSE in his "Field Notes on Lettuce," and it may be pointed out that stocks of Cos Lettuce seed (unlike those of Cabbage Lettuce seed) received directly or indirectly from American sources are in general less definitely characterized than are those grown from seed saved in France or England.

#### AWARDS, DESCRIPTIONS, AND NOTES.

##### A. SEMI-COS VARIETIES.

The semi-cos varieties of Lettuce are compact-growing forms of a glossy dark-green colour (so far as those included in our trials are concerned), and having characters more or less intermediate between the Cos and Cabbage forms. The leaves are less crisp than those of Cos varieties, nor are their midribs so wide; they are longer in proportion to their width than are those of Cabbage Lettuces, and, while the outer leaves have comparatively little spread, the inner make good hard close hearts without tying which stand long before running to seed. They may be planted closely together, six or eight inches between the plants being sufficient.

The varieties included in this group differ from one another mainly in size, but there are also differences in shade of colour and in flavour.

##### AWARDS.

**Madrid Green, A.M.** June 25, 1924. From Messrs. Barr of Covent Garden. For synonyms see below.

**Little Gem, H.C.** June 25, 1924. Sent by Mr. Dawkins of King Street, Chelsea. For synonymous varieties to which the same award was given see below.

**Winter Density, H.C.** July 2, 1924. Sent by Messrs. Clucas of Ormskirk as 'Ne Plus Ultra' (see below).

##### 1. *Seeds black.*

**MADRID GREEN (Barr), A.M.**—8 inches tall, 6 inches wide.\* Very deep green and remaining so until maturity. Leaves somewhat blistered and crumpled, straight-edged. Hearts firm, yellowish, tender, and mild in flavour. Ready June 25.†

Sent also by Messrs. Barr as 'MADRILÈNE,' under which name it appears in French catalogues. In America it appears to be known as 'Dark Green Yellow-hearted.'

##### 2. *Seeds white.*

**LITTLE GEM (Dawkins), H.C.**—6 inches tall and 5 inches wide. At first dark green, the hearts become somewhat bleached as the plants age. The hearts are yellow within, fairly crisp, but not quite so mild in flavour as in 'Madrid Green,' which in other respects it somewhat resembles. Ready June 18.

This variety was also sent as:

**DWARF GEM**, by Messrs. Dickson of Chester.

**GEM Cos**, by Messrs. Harrison of Leicester.

**LITTLE QUEEN**, by Messrs. Ryder of St. Albans.

**SUCRINE**, by Messrs. Nutting of Southwark.

**WINTER DENSITY**, by Messrs. Watkins & Simpson.

These stocks were all good, and share with 'Little Gem' the award of Highly Commended.

\* The width given in every case refers to the diameter of the whole heart, including its outer leaves but not the loose outside leaves of the plant.

† The date of maturity given refers in every case to the maturing of plants sown on April 7, 1924, outdoors, germination taking about 14 or 16 days.

This lettuce was first grown in the Society's Gardens in 1909, when it was sent by Messrs. James Veitch and Messrs. Sutton under the name 'Little Gem.' We have therefore retained this name. It is apparently of French origin, and is listed in French catalogues as 'Sucrine.' The name 'Winter Density' belongs to another variety (see below), and this form should not be confused with it. A black-seeded variety of this type has been sent out as 'Jefferies' Little Gem.' We have not grown it, but from the description it appears to be identical with 'Madrid Green' (see above). We received a stock of 'Little Gem' under the name 'Density' in 1922 (see JOUR. R.H.S., 45, p. 358).

\* \* \*

NONSUCH (Carter).—A taller lettuce than the last (8 inches in height), but of the same diameter, and otherwise similar. Ready June 11. (Grown also in 1917-19 (Sutton).)

This is not to be confused with a Cabbage Lettuce sent out as 'Nonsuch' and similar to 'Deacon' (see JOUR. R.H.S., 45, p. 345), nor with 'Ivery's Nonsuch,' a Cos variety similar to 'Balloon.'

\* \* \*

WINTER DENSITY (Toogood).—8 inches tall, 7 inches wide. Much like 'Madrid Green,' but white seeded and later. Ready June 30.

NE PLUS ULTRA, sent by Mr. Clucas of Ormskirk (H.C.), was a fine stock of this variety.

'Winter Density' was first offered by Messrs. Toogood of Southampton in 1909. They obtained it from Mr. Pain, a market gardener of that district.

\* \* \*

DES CEVENNES (Rivoire).—9 inches tall, 8 inches wide. Compact, upright, with broad, somewhat crumpled, medium dull green leaves, blistered and undulate at the margin, the head leaves being tinged brownish-red. Hearts firm and hard, oblong, rather buttery and tender, but somewhat bitter in flavour. Ready June 27. Very slow to bolt.

It is difficult to place this variety, for it is intermediate between the semi-cos of the 'Little Gem' type and the ordinary Cos Lettuce, and being dwarf looks while young rather like a cabbage variety. The stock was not quite true.

'Little Gem,' 'Nonsuch,' and 'Winter Density' have all been grown as autumn-sown varieties, and while the first suffered somewhat in severe weather the last two all survived, and in all varieties the plants lasted well in the mature condition. 'Little Gem' was given A.M. for autumn sowing in 1923.

## B. COS VARIETIES.

The Cos varieties of Lettuce are characterized by a long leaf with a thick midrib and by the crisp texture of the leaves. They vary in size, colour, season, rate of attaining maturity, and in the length of time they remain after maturity before running to seed.

In selecting varieties to grow particular attention should usually be given to the self-hearting varieties that require no tying, and to the particular season for which each variety is suitable, as well as to flavour. Some varieties, it will be noted, are useless for spring sowing in England, but reference to earlier reports will show their suitability for autumn sowing, although they are practically superseded now for this purpose by cabbage varieties. The market grower will need also to study the requirements of his local market. Size and colour of his produce, as well as season, count for much, and requirements vary in different parts of the country.

### AWARDS.

#### *Award of Merit.*

**Giant White**, July 2, 1924. From Messrs. J. Carter of Raynes Park.

**Paris White**, July 17. From Messrs. R. Veitch of Exeter, Dawkins, Burpee of Philadelphia, Dobbie of Edinburgh, Cullen of Witham, Nutting of Southwark. For other names used for this variety sharing in the award see below.



*Highly Commended.*

**Lobjoit's Green Cos**, July 2, 1924. From Messrs. Watkins & Simpson of Drury Lane, London, and Cooper-Taber of 90 Southwark Street, S.E. For synonymous varieties see below.

**Paris Green**, July 2, 1924. From Messrs. Nutting.

**White Heart**, July 2, 1924. From Messrs. Sutton.

**Dwarf Perfection**, July 2, 1924. From Messrs. Barr.

**Green Provence**, July 2, 1924. From Messrs. Vilmorin of Paris and Messrs. Barr.

**Incomparable** } July 17, 1924. From Mr. F. Dicks and Messrs. Dickson,  
**Nonpareil** }  
Brown & Tait of Manchester.

**Early French Market**, July 2, 1924. From Messrs. Barr.

**Paris Market and Dwarf White Heart**, July 17, 1924. From Messrs. A. Dickson of Newtownards and Messrs. Burpee.

**St. Albans Gem**, July 2, 1924. From Messrs. Ryder of St. Albans.

**Prince of Wales**, July 17, 1924. From Messrs. Watkins & Simpson and Messrs. Barr (see below).

**Victoria White**, July 17, 1924. From Messrs. Dicksons of Chester.

*Commended.*

**Self-folding**, July 2, 1924. From Messrs. Clibrans of Altrincham.

**Kingsholm**, July 17, 1924. From Messrs. Hurst of Houndsditch, E.

**Champion White**, July 17, 1924. From Messrs. Backhouse of York.

**Balloon Cos**, July 17. From various senders under several names.

## I. SEEDS BLACK.

## a. Foliage more or less coloured.

1. *Self-folding*.

**ST. ALBANS GEM** (Ryder), H.C.—A medium-sized variety, early, compact and self-folding. Foliage very dark green with a brownish tinge at margin, nearly plane, crenate and undulate at margin above, of medium thickness. Hearts firm, bright yellow within, with a reddish tinge to the core, of good quality, delicate and somewhat sweet in flavour, crisp. Ready July 1, and slow to bolt.

\* \* \*

**WALKER'S SUGARLOAF** (Nutting, Drummond).—A medium-sized lettuce, 11 inches tall, 7 inches wide; foliage almost smooth, undulate and crenate on margin, dull brown with reddish-brown margins; head solid, pointed, of medium consistence and fair quality, crisp and bitter. Ready July 9, but bolting quickly. Good stocks of an old lettuce.

This is an old variety which received F.C.C. in 1869, and was sent out by Mr. John Walker of Thame many years ago, but is now little grown, and when grown stocks are frequently impure, the above being exceptionally true. Messrs. Drummond's stock came as 'Sugarloaf.'

**ALL SEASONS**, from Messrs. Barr, was similar to 'Walker's Sugarloaf.'

**SOLID BROWN**, from Messrs. Daniels of Norwich, was identical with 'Walker's Sugarloaf' except that it was a shade paler.

2. *Not self-folding*.

**BLACK-SEEDED BATH COS** (Cullen, W. H. Simpson of Birmingham, J. K. King of Coggeshall).—A large lettuce 14 inches tall, 9 inches wide, with somewhat blistered, rather spreading foliage, medium dark green tinged red-brown, especially at margins, rather thick; hearts soft or almost failing, crisp, bitter, of only fair quality. Ready July 10, but many failed to heart and bolted by mid-July (see below).

This variety was received as:

**BROWN OR BATH COS**, from Messrs. R. Veitch of Exeter, A. Dickson of Newtownards, Dobbie of Edinburgh.

**BATH OR BROWN SUGARLOAF**, from Messrs. Toogood of Southampton.

**COVENT GARDEN WINTER BROWN**, from Messrs. Barr.

**IMPERIAL BROWN**, from Messrs. Dicksons of Chester.

**CHAMPION WINTER BROWN**, from Messrs. J. K. King.

**WINTER GREEN**, from Messrs. Webb of Stourbridge.

**DUNNETT'S GIANT WINTER**, from Messrs. J. Carter of Raynes Park.

**LONG STANDING**, from Messrs. Ryder.

**LEVIATHAN**, from Messrs. Cooling of Bath.

SUGARLOAF BATH Cos, from Messrs. Dickson & Robinson, consisted mainly of 'Black-seeded Bath Cos.'

As many of its synonyms suggest, this variety is suited for autumn sowing, not spring.

This variety has also appeared in our trials under the following names (see earlier reports):

'Bath Cos,' 'Giant Bath Cos,' 'Brune Anglaise Noire.'

\* \* \*

BLACK-SEED BATH of Messrs. Sutton is a distinct type from the foregoing, rather brighter in colour and later to heart, hardy and very slow to bolt both in autumn and spring sowing.

\* \* \*

BLOOD-RED WINTER (Barr).—A large lettuce, 13 inches tall, 8 inches wide, hearting to some extent without tying, but better with. Foliage almost smooth, dark reddish-brown with margins redder still; hearts fairly firm, of medium consistence, crisp, bitter, in summer running very quickly to seed.

The only other name which has appeared in our trials for a lettuce similar to this is 'Winter Red,' and that is probably identical. It is the 'Laitue romaine rouge d'hiver' of French seedsmen.

b. Foliage wholly green.

#### 1. Self-folding.

BALLOON (A. Dickson, Cullen), C.—Very large heavy lettuce, 15 inches tall, 10 inches wide, with rather spreading foliage; medium green, blistered and undulate at the margin, thick; hearts firm and of fair quality, rather bitter and crisp, slow to go to seed. Ready July 11.

A favourite lettuce for exhibition where size is desired, but rather slow to mature.

This variety was also received as:

EXHIBITION, from Messrs. Webb.

DREADNOUGHT, from Messrs. Daniels.

GIANT SUMMER, from Messrs. Harrison.

STIRLING WHITE, from Messrs. Drummond.

BLANCHLAND WHITE, from Messrs. Finney of Newcastle.

THE BARNUM, from Messrs. Barr.

MAMMOTH, from Messrs. R. Veitch.

MAMMOTH WHITE, from Messrs. Hurst & Dawkins.

These were all good stocks and share with the first two the award of Commended.

It is the 'Laitue Romaine Ballon' and 'Romaine de Bouvival' of French seedsmen.

This variety is not as hardy as some, only 10 to 30 per cent. coming through the winter without damage in severe weather.

Cultivated in England for at least forty years.

\* \* \*

ROYAL GREEN WINTER (Barr).—A medium-sized lettuce, 11 inches high, 6 inches wide, compact and hearting without tying. Foliage very dark glistening green, of medium thickness, slightly blistered, crenate above; hearts firm, of fair quality, and bitter flavour. Ready July 10, and as a summer lettuce running quickly to seed.

#### 2. Not Self-hearting.

ROMAINE VERTE D'HIVER (Truffaut).—A medium-large lettuce, 12 inches tall, 8 inches wide, of rather spreading habit. Leaves blistered, crenate on upper margin and rather undulate, medium dark dull green, thick; flavour rather mild and bitter, crisp and tender. Unsuitable for spring or summer sowing, the plants bolting without hearting.

This variety was grown in 1922 in our trial of winter varieties under the name of 'Royal Green.' It proved hardy but formed rather loose hearts (see vol. 49, p. 261).

\* \* \*

WHITE LONG STANDING (Rivoire).—A very distinct lettuce. Foliage growing erect but not forming a definite heart, of a light yellowish green, somewhat blistered, bitter and crisp. It did not begin to run to seed until the early part of September, and is said to heart in the South of France, where its long standing qualities are particularly valuable, since so many varieties tend to bolt quickly there.

## II. SEEDS WHITE.

## a. Foliage more or less coloured.

We have met with no white-seeded varieties of Cos lettuce in our trials with any red whatever in their foliage.

## b. Foliage Green.

1. *Self-folding.**Foliage dark green.*

The varieties first to be dealt with may be grouped under the old variety 'Paris Green Cos,' the 'Laitue Romaine Verte Maraîchère' of the French catalogues. Many names are attached, some of them mere synonyms, some applied to forms selected out and bred for some minute difference.

PARIS GREEN Cos (Kelway, Cullen, R. Veitch).—12 inches tall, 8 inches wide, upright, leaves medium dark green, of medium thickness, slightly blistered and undulate at the crenate margin; hearts somewhat three-cornered, firm, of good quality, crisp, fairly mild and slightly bitter. Ready June 28. Stood well.

The following could not be distinguished from 'Paris Green':

HEARTWELL, from Messrs. Harrison.

EMERALD GIANT, from Messrs. J. Carter.

WHITE HEART, from Messrs. Sutton (H.C.).

Of these the most regular stock was 'White Heart' from Messrs. Sutton, and this was awarded H.C.

PARIS GREEN (Nutting), H.C.—A lettuce similar in all respects to the foregoing stocks of 'Paris Green' except in size, being 14 inches tall and 9 inches wide, as large in fact as its paler counterpart, 'Paris White.' Ready June 28.

\* \* \*

GREEN PROVENCE (Barr), H.C.—A large lettuce of good quality, 13 inches tall, 8 inches wide, upright and compact. Foliage dark green, crenate in upper part, somewhat blistered and rather undulate on border, of medium thickness. Hearts solid, of good quality, mild and slightly bitter, crisp. Ready June 26, and slow to run, as the true form always is. Occasionally a form is sold under this name that bolts quickly.

ROMAINE VERTE DE PROVENCE, from Messrs. Vilmorin, shares with this the award of H.C.

This variety is grown in France as a winter lettuce, but we have not tried it as such hitherto.

\* \* \*

EARLY FRENCH MARKET (Barr), H.C.—A medium-sized lettuce, 12 inches tall, 8 inches wide, compact. Foliage dark green, somewhat blistered, crenate and undulate above, fairly thick. Hearts firm, somewhat flatter than in 'Green Provence,' mild, rather bitter, crisp. Ready June 26, and standing for over three weeks without bolting.

BARR'S EARLY FRAME, from Messrs. Barr, shares the award with the foregoing, and is similar to it in every way.

We have not grown this as a winter lettuce.

There are cabbage lettuces with similar names, which should not be confused with these.

\* \* \*

ST. ALBANS ALL HEART (Hurst).—A medium-sized lettuce of 'Paris Green' type, but a shade darker, later, and somewhat smaller; 11 inches tall, 8 inches wide; hearts firm, of good quality, crisp and bitter. Ready July 9, and standing fairly well.

\* \* \*

ROMAINE VERTE MARAÎCHÈRE (Rivoire).—A lettuce of medium size, 10 inches tall, 6 inches wide, very compact. Foliage dark green, undulate at margin, of medium thickness; hearts firm, of good quality, mild and crisp. Ready July 9, and running quickly to seed.

A small form of 'Paris Green,' but not desirable for English conditions.

\* \* \*

ROMAINE GRISE MARAÎCHÈRE (Vilmorin).—A larger lettuce than the last or the next; 11 inches tall, 7 inches wide. Compact in growth, with dark green foliage, nearly smooth and undulate at the margin, of medium consistence; hearts solid, cream when cut, of good quality, mild and crisp. Ready July 5, and very slow to bolt.

This is nearly related to 'Paris Green Cos,' but greyer and forms a transition to the 'Dwarf Perfection' group.

VAUX'S SELF-FOLDING GREEN COS (Hurst).—Except that the leaves are perhaps more blistered than in the last, this seems identical in size, season, and quality.

\* \* \*

LOBJOIT'S GREEN COS (Watkins & Simpson, Cooper-Taber), H.C.—By this name a lettuce selected from 'Romaine grise maraîchère' is commonly grown in England. It is a lettuce of excellent quality and a favourite in the market as a rule. The stocks received under this name were slightly taller than those described under the type, being 12 inches tall, but were otherwise similar.

ALL HEART (Nutting), H.C., was indistinguishable from the foregoing, as was EMERALD GREEN, from Messrs. Barr.

GIANT WHITE (Carter), A.M., was nearly like 'Lobjoit's Green,' and proved a true, even stock, with very firm hearts of excellent quality. Ready July 1, and very slow to bolt.

\* \* \*

CHELSEA IMPERIAL (Dawkins).—A fairly large lettuce, 11 inches tall, 8 inches wide. Foliage medium green with a greyish tinge, somewhat blistered and undulate at border. Hearts firm, of good quality, mild and crisp. Ready July 1, and standing well for three weeks.

SELF-FOLDING (Clibrans) was identical with this and a good stock (C.).

SUPERB GREEN (Dawkins) proved to be a mixed stock, mainly like 'Chelsea Imperial,' but containing many plants running quickly to seed.

\* \* \*

ROMAINE DE MONPLAISIR (Rivoire).—Rather smaller than 'Romaine grise maraîchère' and rather blistered; hearts of good quality, mild and rather bitter. Ready July 7, but bolting quickly.

\* \* \*

DWARF PERFECTION (Barr), H.C.—A large but dwarf and early lettuce; 9 or 10 inches tall and 7 or 8 inches wide; foliage dark dull green, paler at the margins, so that the head at maturity appears grey-green, nearly smooth, crenate, and somewhat undulate at margin, rather thick; hearts firm, of excellent quality, mild and crisp. Ready June 26, i.e. two months from germination.

An excellent variety for the private garden, introduced by Messrs. Sutton.

ECLIPSE, from Messrs. Burpee, was identical with this, but a less regular stock.

LITTLE WONDER, from Messrs. J. K. King, consisted mainly of this variety, but was mixed with others.

EXPRESS COS also appears to be identical, and the original name is said to be 'Johnson's Eclipse Cos.' One stock under the name of 'Express' contained a mixture of forms related to this.

\* \* \*

ROMAINE VERTE À CHASSIS (Rivoire) appears identical with 'Dwarf Perfection,' except that it is even dwarfer, measuring 8 inches tall by 6 inches wide, maturing at approximately the same time, forming the same excellent hearts and standing very well indeed.

LIGHTNING, from Mr. Clucas, was of the same size and season as 'Romaine Verte à Chassis.'

\* \* \*

ROMAINE DE L'HERAULT (Rivoire).—Very similar to 'Dwarf Perfection'; 9 inches tall, but with rather narrower heads; like the last, ready July 7, and with somewhat crumpled foliage. It stands well.

\* \* \*

FULHAM COS (Hurst).—In many ways similar to 'Dwarf Perfection,' but with rather narrower heads, later to mature, and with more pointed leaves of thinner texture. Ready July 5, and standing well.

SHARPE'S STANDARD (Barr).—A true even stock of a large lettuce, 12 inches tall, 8 inches wide. Foliage dark dull green, almost plane, undulate, and crenate at margin; of medium consistence. Hearts firm, of fair quality, mild and crisp. Ready July 7, but not particularly suitable for summer sowing, as it bolts very quickly.

We have not grown this as a winter lettuce.

In 1919 the stock received under this name (see JOURNAL, 45, p. 351) was the same as 'Superb White' of Messrs. Sutton (see under 'Paris White'), but this appears to be the true stock.

\* \* \*

PARIS MARKET (A. Dickson), H.C.—A large lettuce, 12 inches tall, 8 inches wide, compact. Foliage dark green, but rather paler than 'Sharpe's Standard'

and of a greyish shade, slightly blistered and undulate near the border, of medium thickness. Hearts firm, of good quality, slightly bitter, mild and crisp. Ready July 7, standing until July 21.

DWARF WHITE HEART (Burpee), H.C., was like 'Paris Market.' This variety is known also as 'Celery Cos.' Grown as a winter lettuce it proved less hardy than many, but in summer turns in and stands well.

\* \* \*

GIANT WHITE EXHIBITION (Finney).—A large, compact lettuce, 13 inches tall, 9 inches wide, near 'Lobjoit's Green' type but larger, and a shade darker than 'Early French Market.' Foliage fairly dark green, somewhat blistered and undulate. Hearts firm, of good quality, mild and crisp. Ready July 1 and standing for a fortnight.

\* \* \*

LONDON WHITE (Hurst).—Best described as like 'Dwarf Perfection,' but taller and somewhat paler; 11 inches tall by 7 inches wide. Leaves rather pointed. Ready July 2 and standing well.

A stock from Messrs. Veitch under this name consisted partly of this and partly of a taller, later form which also came to us under the name 'London White' from Messrs. Nutting (see under 'Paris White'), but which differs from Hurst's variety in several ways. There are thus two distinct varieties grown under this name. The form now under consideration came to us on this and on previous occasions under the name

WHITE COS, from Messrs. Sutton.

It is a lettuce of good quality and size for summer use. We have not tested it in winter.

This variety is sometimes said to be identical with 'Paris White,' but it is evidently distinct.

*Foliage medium green.*

PARIS WHITE COS (see below).—A larger lettuce than 'Paris Green,' with paler foliage. 14 inches tall, 8 inches wide; foliage upright, somewhat blistered, undulate at margin, of medium texture, self-hearting; hearts pale, cream inside, large, tall, thick, blunt, firm, of good quality, mild and crisp. Ready July 1; slow to bolt.

[This lettuce, which was a favourite in northern markets until recently (the darker forms lately finding favour), is grown under a variety of names and in slightly different forms according to the type selected by different growers.]

The stocks sent by the following seedsmen as 'Paris White' conformed to the above description and were awarded A.M.: Messrs. Dobbie, R. Veitch, A. Dawkins, and Burpee of Philadelphia.

Somewhat less regular stocks came under the same name from Messrs. W. H. Simpson, Barr, J. K. King, and G. Cooling.

Of the same size and season were:

WHITE IMPROVED, sent by Messrs. Harrison (A.M.).

SUPERB WHITE, from Messrs. Sutton (A.M.).

In these two stocks the foliage was perhaps a little more blistered and a shade darker than in the stocks mentioned above, but they were not markedly different. Another stock of 'Superb White,' from Messrs. Carter, was less regular.

This variety has not done well as a winter lettuce at Wisley.

\* \* \*

Of the same height and in every way similar, except that the plants had hearts of 9 inches instead of 8, were good stocks received as

PARIS WHITE from Messrs. Nutting and Messrs. Carter, and as

GIANT PARIS WHITE from Messrs. R. Sydenham.

These share the A.M. This 'Giant Paris White' is distinct from the true 'Giant White' (see below).

A taller selection, 15 inches in height, of the same season and type came from Messrs. Cullen (A.M.).

LONDON WHITE from Messrs. Nutting was of similar type, but rather late.

A dwarfier form only 13 inches tall with equally good large hearts came under several names. It matured about a week later than 'Paris White,' although reputed to be earlier, and stood for over a fortnight without bolting.

The stocks of this type and awards were:

TRIANON EARLY WHITE, from Messrs. A. Dickson (A.M.).

SUMMER WHITE, from Messrs. W. H. Simpson (A.M.).

SUPERB CHAMPION WHITE, from Messrs. Dicksons of Chester (A.M.).

ALEXANDRA, from Messrs. Cooper-Taber.

ALEXANDRA WHITE, from Messrs. Dobbie (A.M.).

ROMAINE BLONDE MARAÎCHÈRE (MARKET WHITE), from Messrs. Vilmorin, Messrs. Rivoire, and Messrs. Truffaut.

PAR EXCELLENCE, from Messrs. Dickson, Brown & Tait.

IDEAL, from Messrs. Webb.

CHESNAY LARGE WHITE and

COVENT GARDEN SUMMER WHITE, both from Messrs. Barr, proved to be of the same size and form as 'Paris White,' but a trifle darker and as late as the 'Trianon' selection, but otherwise similar to 'Paris White.'

\* \* \*

COLCHESTER (Watkins & Simpson).—A large lettuce, 14 inches tall, 8 inches wide, of rather spreading habit. Foliage medium green, slightly blistered, crenate and undulate at margin of upper part of leaf; of medium thickness. Hearts firm, of good quality, crisp and bitter. Ready July 9; slow to run. Much like 'Early French Frame,' but paler.

\* \* \*

SIBERIAN WHITE (F. Dicks) was similar in appearance to 'Colchester,' but 9 inches wide, and made only rather soft hearts, running quickly after maturity.

We have not tried this variety as a winter lettuce.

\* \* \*

CRYSTAL COS (Hurst).—A medium-sized lettuce of 'Paris White' type, but smaller and brighter green, rather slow to mature and slow to run; more leafy than 'Paris White.' 11 inches tall, 7 inches wide, compact and upright. Foliage almost plane, undulate and crenate in upper part of leaf, medium green, of medium thickness. Hearts becoming firm without tying, of fair quality, mild and crisp.

This lettuce is said to be much grown in Western France, and to succeed well in South Africa.

PEERLESS, from Messrs. Sutton, proved to be like this variety.

Attempts to grow this as a winter variety have failed entirely, the stock dying in winter.

#### *Foliage light green.*

JUMBO (Carter).—A large lettuce, 13 inches tall, 8 inches wide, rather spreading in habit. Foliage light medium green, somewhat blistered, of medium thickness. Hearts moderately firm, of fair quality, rather bitter, crisp. Ready July 7, and soon running.

CHAMPION WHITE (Dickson & Robinson) proved a lettuce of similar size, colour, and season.

\* \* \*

INCOMPARABLE (F. Dicks), H.C.—A large early lettuce, of same size as 'Jumbo.' Foliage light medium green, slightly blistered and faintly undulate at margin; of medium thickness. Hearts firm, of good quality, mild and slightly bitter, crisp. Ready July 1 and standing well.

NONPAREIL (Dickson, Brown & Tait) was exactly similar and shares the award.

WINTER WHITE, of Messrs. Sutton and Webb, appears to be nearly related to this and is very hardy, all plants surviving the hard winter of 1917-18.

\* \* \*

EARLY FRENCH ROMAINE (Nutting).—A medium-sized lettuce 12 inches tall, 7 inches wide. Foliage medium bright green, nearly plane, crenate and undulate at margin, of medium thickness. Hearts firm, of good quality, mild and crisp. Ready July 7, standing for a fortnight.

EARLY PERFECTION, from Messrs. Toogood, was identical with this.

\* \* \*

LITTLE GEM (Dickson & Robinson).—A lettuce of medium size, 10 inches tall, 8 inches wide, of compact habit. Foliage light yellowish green, almost plane, of medium thickness, border not undulated but crenate at apex. Hearts solid, of medium quality, mild and crisp. Ready July 6; standing well.

This variety is not to be confused with the dark-green semi-cos 'Little Gem,' or with the cabbage lettuce of the same name.

\* \* \*

ROMAINE DE FRONTIGNAN (Rivoire).—A narrower lettuce than 'Little Gem,' only 6 inches wide, but of the same height; the borders of the leaves somewhat undulate, of not quite such good quality and much later; not ready until July 5.

2. *Need Tying.*

We have included below not only the varieties which do not heart without tying, but also those which will form hearts without but are the better for tying, since in hot dry weather the foliage tends to spread. Several of these might be regarded as 'Paris White' varieties with a tendency to "flop."

**GIANT WHITE** (Watkins & Simpson, Dobbie, Nutting).—A very large lettuce, 14 to 15 inches tall and 8 inches wide, rather spreading in habit. At maturity, unless tied, the outer leaves in warm weather fall almost flat, and the variety is therefore better tied and forms firmer hearts so treated. Foliage medium green, somewhat blistered, crenate and rather blistered and undulate at the margin in upper part; of medium consistence. Hearts fairly firm, but, as already pointed out, better for tying, of good quality, rather bitter, crisp. Rather late to mature, the greater number not being ready until July 10; standing long.

This variety is, no doubt, nearly related to 'Paris White,' but differs from that variety in the floppy habit already referred to and in being not so self-folding.

**GIANT SELF-HEARTING WHITE**, from Messrs. J. K. King, was identical with 'Giant White,' as was

**EXHIBITION**, from Messrs. Dobbie.

A stock sent in by Messrs. Clucas under the name of **KER'S GIANT WHITE**, and said to be the original stock of this variety, was almost exactly like 'Giant White,' but differed in very small details.

**VICTORIA WHITE**, from Messrs. Dicksons of Chester, and

**MAGNUM BONUM**, from Messrs. Nutting, also belong here, but the latter is perhaps slightly darker in shade when young.

**COVENT GARDEN WINTER WHITE** proved the same as 'Giant White,' and in our winter trials has in some years proved quite tender, only 10 per cent. surviving in 1917-18, exactly as with 'Monstrous White,' referred to next.

**MONSTROUS WHITE** (Webb) is a lettuce with the same characters as 'Giant White,' but even larger, measuring 14 inches tall by 10 inches wide. The stock was not quite true.

**MONSTER WHITE**, of Messrs. Toogood, was similar to 'Monstrous White,' and **GOLIATH WHITE COS**, of Messrs. Clucas, also belongs here.

\* \* \*

**VERSAILLES** (Watkins & Simpson) has similar characters to 'Giant White,' but was only 13 inches tall and 8 inches wide; matured on July 5, and stood for a fortnight without deterioration.

**ROMAINE GROSSE BLONDE DE VERSAILLES** (Truffaut) was exactly similar; so were

**JUMBO**, from Messrs. Barr (not to be confused with 'Jumbo' from Messrs. Carter); and

**FISHER'S SUPERB SUMMER**, from Messrs. Fisher, Son & Sibray.

**MAMMOTH WHITE** (Nutting) is of the same size as 'Versailles' and otherwise similar, but it is of a shade darker when young.

\* \* \*

**KINGSHOLM** (Hurst), C.—A large lettuce, 13 inches tall, 8 inches wide, and, like others of this type, the better for tying. Foliage rather darker than 'Giant White'; hearts fairly firm, of good quality, rather bitter, crisp. Ready July 7 and standing well, but not quite so long as 'Giant White.'

In 1919 the lettuce sent to us under this name had lighter foliage. The lettuce originally known as 'Kingsholm' was 'Alexandra,' a form of 'Paris White,' but in process of time the type seems to have changed somewhat.

\* \* \*

**PRINCE OF WALES** (Watkins & Simpson), H.C.—A large variety, a shade darker than 'Paris White' and in habit like 'Giant White,' but 12 inches tall and 8 inches across, with slightly thicker, rather narrower leaves. Ready July 5 and standing well for a fortnight. The hearts are less firm than 'Paris White' unless they are tied.

Other but less regular stocks came under this name from Messrs. Cooper-Taber, A. Dickson, and Nutting.

**MOOR PARK**, from Messrs. Barr, was a good stock (H.C.) of this lettuce.

\* \* \*

**CHAMPION WHITE** (Backhouse), C.—A lettuce 13 inches tall, 8 inches wide, with rounder outer leaves than those of 'Giant White,' but otherwise similar.

It makes firm hearts of good quality, crisp, with a slightly bitter flavour. The foliage is intermediate between 'Giant White' and Carter's 'Jumbo.' Ready July 7 and standing fairly well.

\* \* \*

SILVER COS (Kelway).—A lettuce of similar size and season to 'Champion White,' but with rather more blistered leaves and greyer in its general aspect. Ready July 7, standing for a fortnight.

\* \* \*

The remaining varieties do not heart unless tied.

HICKS' HARDY WHITE (Cullen, Dobbie).—A large lettuce 13 inches tall by 10 inches wide; foliage spreading, somewhat blistered, crenate and undulate at the edge, of medium consistence; hearts fairly solid, rather bitter and crisp.

This is not a good lettuce for spring sowing, but often sown in autumn and making fairly good hearts in spring so grown, and quite hardy. The hearts made by the spring-sown plants were very poor and the plants ran rapidly to seed.

Sent also as HARDY WINTER WHITE by Messrs. Nutting, J. K. King, Hurst, and R. Veitch.

\* \* \*

SUPERIOR WINTER WHITE (Harrison).—12 inches tall, 8 inches wide, of rather spreading habit, and needing tying to produce the best results. Foliage medium green, undulate and crenate at margin, somewhat blistered, of medium thickness. Hearts firm when mature, of fair quality, mild and crisp. Ready July 9, but not a long-standing variety, and in some years running to seed without hearting. Better as a winter lettuce, being very hardy.

A stock received from Messrs. Toogood under the name of 'Ivery's Nonsuch' was like this, but was evidently sent in error, for 'Ivery's Nonsuch' is a black-seeded variety.

NUNEHAM PARK, from Messrs. Webb, was like this variety in all ways, and

WINTER SUPERLATIVE, from Messrs. Toogood, was also of this type but a little taller, and ran to seed without hearting.

#### LIST OF VARIETIES OF COS LETTUCE REFERRED TO.

Alexandra	Early Perfection
Alexandra White	Eclipse
All Heart	Emerald Giant
All Seasons	Emerald Green
Balloon Cos	Exhibition
Barr's Early Frame	Express Cos
Bath Cos	Fisher's Superb Summer
Bath Sugarloaf	Fulham Cos
Black Seed Bath	Gem Cos
Black-seeded Bath Cos	Giant Bath Cos
Blanchland White	Giant Paris White
Blood-red Winter	Giant Self-hearting White
Brown Cos	Giant Summer
Brown Sugarloaf	Giant White
Brune Anglaise Noire	Giant White Exhibition
Celery Cos	Goliath White
Champion White	Green Provence
Champion Winter Brown	Hardy Winter White
Chelsea Imperial	Heartwell
Chesnay Large White	Hicks' Hardy White
Colchester	Ideal
Covent Garden Summer White	Imperial Brown
Covent Garden Winter Brown	Incomparable
Covent Garden Winter White	Ivery's Nonsuch
Crystal Cos	Jefferies' Little Gem
Dark Green Yellow-hearted	Johnson's Eclipse Cos
Density	Jumbo
Des Cevennes	Ker's Giant White
Dreadnought	Kingsholm
Dunnett's Giant Winter	Leviathan
Dwarf Gem	Lightning
Dwarf Perfection	Little Gem
Dwarf White Heart	Little Queen
Early French Market	Little Wonder
Early French Romaine	Lobjoit's Green Cos



London White	Royal Green
Longstanding	Royal Green Winter
Madrid Green	St. Albans Allheart
Madrilène	St. Albans Gem
Magnum Bonum	Self-folding
Mammoth	Sharpe's Standard
Mammoth White	Siberian White
Monster White	Silver Cos
Monstrous White	Solid Brown
Moor Park	Stirling White
Ne Plus Ultra	Sucrine
Nonpareil	Sugarloaf
Nonsuch	Sugarloaf Bath Cos
Nuneham Park	Summer White
Par Excellence	Superb Champion White
Paris Green	Superb Green
Paris Market	Superb White
Paris White	Superior Winter White
Peerless	The Barnum
Prince of Wales	Trianon Early White
Romaine ballon	Vaux's Self-folding Green
Romaine blonde maraîchère	Versailles
Romaine de Bouvial	Victoria White
Romaine de Frontignan	Walker's Sugarloaf
Romaine de l'Hérault	White Cos
Romaine de Monplaisir	White Heart
Romaine grise maraîchère	White Improved
Romaine grosse blonde de Versailles	White Long-standing
Romaine rouge d'hiver	Winter Density
Romaine verte à chassiss	Winter Green
Romaine verte d'hiver	Winter Red
Romaine verte de Provence	Winter Superlative
Romaine verte maraîchère	Winter White

## RASPBERRIES TRIED AT WISLEY, 1922-25.

FORTY-SEVEN stocks were received for trial, representing thirty-two summer-fruiting and five perpetual-fruiting red-berried, and two summer-fruiting yellow-berried varieties. Seven of these stocks represented unnamed seedlings, sent in under number, and since no awards were made to them they are not here described.

The stocks were planted in the winter of 1922-23 in well-prepared ground, adjoining the 1919 trial plot of Raspberries. Throughout they received normal treatment, the newly planted canes being cut down to within 6 or 9 inches of the ground, a light manure mulch applied in early spring, and all old canes pruned away as soon as the crop was gathered. The canes were trained to a light wire trellis. Healthy cane growth was made by all varieties in the season following planting, and in the summer of 1924 good crops were carried by most. The 1925 raspberry crop was on the whole very good, and the trial was inspected by a sub-committee of the Fruit and Vegetable Committee from time to time, and on July 7, 1925, recommendations were made for award.

The awards now made are additional to those announced in the report of the 1919 trial,\* and the varieties then grown were available for comparison with the stocks now reported upon.

In the previous report a rough method of grouping the varieties was adopted which it was thought would aid identification. Many of the characters then used in the grouping have proved unstable however, and a complete classification of all the varieties now grown in the trial plot can only be attempted after they have been under observation for a few years longer.

The Council has made the following awards :

## AWARD OF MERIT.

## SUMMER-FRUITING. RED.

PARADISE BERRY (*T. Bryne*).—Berries large, round or bluntly conical ; firm, deep red. Flavour good. Mid-season, ripening successively over long period. Has cropped heavily. Leaves flattish, often downcurled, rugose or much ribbed. Moderately vigorous, making sturdy upright canes that require little or no support. 4 feet. New canes many, strong, downy, with slight red-purple colouring. Winter canes light brown. Received from Stavanger, Norway.

RELiance (*Morgan*).—Berries medium to large, roundish conical, good bright colour, easily "plugged," borne on fairly long pedicels. Flavour sweet. Early. Has cropped heavily. Leaves large, flattish, deep green. Vigorous. 6 feet. Young canes pale, sturdy, upright, with purple colouring on lower half. Winter canes reddish. Raised by Mr. A. J. Morgan of Bosahan, St. Martin, S.O., Cornwall ('Perfection' × 'Superlative'), in 1907. Another stock of this variety was received from the raiser under the name of 'Matchless.'

REWARD (*Laxton*).—Berries medium, round or conical, rich red, firm. Flavour sweet, good. Season, second early, the berries remaining a good bright colour over a long period. Has carried very heavy crops. Leaves flattish, dull. Vigorous, making long, strong, upright canes. 6 to 7 feet. New canes many. Winter canes red. Raised and introduced by Messrs. Laxton, Bedford.

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\* R.H.S. JOURNAL, vol. 47, pt. 1, p. 43.

## HIGHLY COMMENDED.

## SUMMER-FRUITING. RED.

**LAXTON'S PROLIFIC** (*Laxton*).—Berries medium, roundish or conical, deep red, firm. Flavour sweet. Mid-season or rather late. Very heavy cropper. Leaves large, flattish, or slightly downcurled, bright green. Very vigorous, making tall, strong canes. 8 to 9 feet. New canes very many, sparsely spined, with much pale "bloom." Winter canes reddish-brown. Raised and introduced by Messrs. Laxton, Bedford. This variety was Commended in the 1919 trial.

**STORRIE'S INVINCIBLE** (*Storrie & Storrie*).—Berries large, conical, firm, good bright colour. Flavour very good, sweet. Mid-season. Has cropped well. Leaves large, downcurled at tips, sometimes considerably curled. Moderately vigorous, rather straggling habit. 5 to 6 feet. New canes many, pale, with many conspicuous, dark spines. Winter canes brown. Raised and introduced by Messrs. Storrie & Storrie, Glencarse, Perth. This variety somewhat resembles 'Norwich Wonder.'

**WINKLER'S SAMLING** (*T. Rietsema*).—Berries medium to large, roundish, fairly firm, good bright colour. Flavour good. Drupelets fairly large; berries not easily "plugged" and often breaking up when gathered. Early; long season. Has cropped heavily. Leaves medium, dark, flattish or slightly downcurled. Moderately vigorous, upright. 5 to 6 feet. New canes many, with pale "bloom." Winter canes dark brown. This variety was sent by Messrs. Bunyard, Maidstone, at the request of Mr. T. Rietsema, Breda, Holland.

## COMMENDED.

## SUMMER-FRUITING. RED.

**EPICURE** (*Harraway*).—Berries medium, conical, firm, bright red. Flavour sweet. Little early. Has cropped heavily. Leaves large, dark, mostly curled under. Moderately vigorous. 5 feet. New canes many, sparsely spined, with reddish-purple colouring. Winter canes deep brown. Raised ('Superlative' x 'Royal') and introduced by Messrs. T. H. Harraway, Warminster, and claimed to be a reinvigorated 'Superlative' with sweeter flavour than 'Royal.'

**RED ANTWERP** (*Millar*).—Berries medium, bluntly conical, deep red, firm. Flavour sweet. Early. Moderate cropper. Leaves medium, dark, rugose, flattish or downcurled; often much curled at end of season. Moderately vigorous. 4 feet. New canes rather few, weakly, with much pale "bloom" and numerous dark spines. Winter canes deep brown. This is probably the true Red Antwerp, a variety recorded as early as 1802. From Mr. Millar of Rattray, Blairgowrie.

**RIVAL** (*Laxton*).—Berries large, long, conical, firm, dark red. Flavour good. Rather late. Has cropped heavily. Leaves large, dark, rugose, slightly downcurled. Vigorous. 6 feet. New canes many, upright, sturdy, almost spineless. Winter canes reddish-brown. Raised and introduced by Messrs. Laxton, Bedford.

## OTHER VARIETIES ADDED TO THE TRIAL AFTER 1919.

## SUMMER-FRUITING. RED.

**ABUNDANCE** (*S. J. Smith*).—Berries medium, nearly round, dull red, soft, drupelets rather large. Flavour fair. Mid-season. Has cropped well. Leaves large, flattish, broad. Vigorous. 6 feet. New canes many, sturdy. Winter canes light brown. Parentage unknown; seedling appeared in 1913 in garden near Pontypool. In many ways resembles 'Baumforth's Seedling.'

**ALICIA** (*Lansdell*).—Berries medium to large, roundish, bright red, little soft, often breaking up when gathered. Flavour sweet. Mid-season. Has cropped moderately well. Leaves large, dark, flattish, broad. Moderately vigorous. 4 to 5 feet. New canes many, sturdy, upright. Winter canes light brown. Raised (Devon Raspberry x Loganberry) and introduced by Mr. F. J. Lansdell, Southbourne.

**BAUMFORTH'S SEEDLING** (*Millar*).—Berries medium, conical, dull red, firm. Flavour sweet. Mid-season. Heavy cropper. Leaves large, dark, slightly downcurled. Vigorous. 6 feet. New canes many, stout, upright, with slight purple colouring. Winter canes deep brown. This is not the original 'Baumforth's

Seedling,' as represented by the stock described in the 1919 report, but is probably the variety most commonly grown under this name.

**BLACK ANTWERP** (*Millar*).—Berries medium, bluntly conical, dark red, rather soft. Flavour sweet. Mid-season. Leaves dark, rugose, often slightly curled under. Moderately vigorous. 4 feet. New canes few, reddish-purple, with much pale bloom and numerous long spines. Winter canes reddish-brown. Closely resembles 'Red Antwerp.'

**BLACKBIRD** (*Simpson*).—Berries medium, round, dull red, soft. Little flavour. Mid-season or little late. Has cropped lightly. Leaves dark green, rugose, often downcurled. Very vigorous. 7 feet. New canes many, strong, tall, sparsely spined, with pale "bloom." Winter canes reddish-brown. Raised ('Superlative' × unknown variety) and introduced by Mr. Wm. Simpson, Ribston Hall, Wetherby.

**COPELAND'S PLUM** (*Copeland*).—Berries medium, deep red, rather soft, often breaking up when gathered. Flavour fair. Mid-season. Carried heavy crops. Leaves large, flattish or downcurled. Very vigorous, straggling. 7 feet. New canes many, strong, with numerous scattered dark spines. Winter canes brown. Raised (Raspberry × Blackberry) and introduced by Mr. W. F. M. Copeland, Shirley, Southampton.

**ELEPHANT** (*Copeland*).—Berries very large, conical, firm. Flavour fair. Mid-season. Has cropped moderately well. Leaves large, dark, flattish or slightly downcurled. Vigorous, straggling. 7 feet. New canes many, stout. Winter canes brown. Raised (seedling from 'Hornet') and introduced by Mr. W. F. M. Copeland.

**HANCOCK'S CRIMSON GIANT** (*Hancock*).—Berries large, roundish conical, dull red, soft; drupelets large. Flavour fair. Early. Heavy cropper. Leaves large, dark, flattish, or slightly curled. Very vigorous. 7 to 8 feet. New canes many, strong, upright. Winter canes reddish-brown. Raised ('Perfection' × seedling Raspberry) and introduced by Mr. T. Hancock, Mansfield.

**HERBERT** (*Fell*).—Berries medium, round or conical, bright red, soon becoming dull; fairly firm, drupelets large, berries often breaking up when gathered. Little flavour. Fairly early. Has cropped well. Leaves large, dark, slightly downcurled. Moderately vigorous. 4 to 5 feet. New canes many, upright, reddish-purple, with long sharp spines. Winter canes deep brown. Raised by Mr. R. B. Whyte, Ottawa, and introduced by Messrs. Fell, Hexham.

**MARKET FAVOURITE** (*Robinson*).—Berries medium, roundish conical, dull red, firm. Leaves curled under. A very mixed stock, most canes closely resembling 'Superlative.'

**MCLAREN'S PROLIFIC** (*Storrie & Storrie*).—Berries medium, conical, bright red, fairly firm. Flavour fair, acid. Early. Has cropped moderately well. Leaves flattish, rugose. Moderately vigorous. 5 feet. New canes many, downy, much "bloom" and numerous long, soft, brown-tipped spines. Winter canes brown. Introduced by Messrs. Storrie & Storrie, Glencarse.

**MARY COPELAND** (*Copeland*).—Berries large, round, bright red, fairly firm, but often breaking up when gathered. Flavour sweet. Little late in ripening. Has cropped heavily. Leaves large, dark, rugose, little curled. Very vigorous, straggling. 7 feet. New canes many, strong, with much "bloom" and small, scattered dark spines. Winter canes deep brown. Raised and introduced by Mr. W. F. M. Copeland, who states that neither parent was a true Raspberry.

**PAN** (*Burnett-Stuart*).—Berries large, roundish conical, often breaking up when gathered. Flavour fair. Mid-season. Has cropped heavily. Leaves large, flattish, broad. Very vigorous. 6 feet. New canes many, upright, almost spineless. Winter canes deep brown. Found growing in a wood near Chelmsford and introduced by Mr. G. Burnett-Stuart of Manor Farm, Gay Bowers, Danbury, Essex. The stock received was mixed.

**PICKERING SEEDLING No. 1** (*Roger*).—Berries large, roundish conical, bright red, rather soft. Flavour good. Mid-season. Has cropped well. Leaves large, dark, flattish, broad. Very vigorous. 7 to 8 feet. New canes many, upright, sparsely spined, much pale "bloom." Winter canes deep brown. Raised and introduced by Mr. R. V. Roger, Pickering, Yorks. The stock received was mixed.

**SEMPER FIDELIS** (*Millar*).—Berries round, rather soft, bright colour. Flavour acid. Little late in ripening. Cropped moderately well. Leaves rugose, flattish or slightly downcurled. Leaflets very narrow. Moderately vigorous. 5 feet. New canes many, greenish, numerous long dark spines and much "bloom." Winter canes deep brown.

**SPION KOP** (*Sherratt*).—Berries rather small, roundish, bright red, rather soft. Flavour fair. Mid-season. Has cropped moderately well. Leaves flattish, often downcurled, light green. Vigorous. 6 feet. New canes many, sturdy, upright.

Winter canes light brown. Raised and introduced by Messrs. Sherratt of Burton-on-Trent.

**SUGAR BERRY** (*Copeland*).—Berries rather small, roundish conical, bright colour, fairly firm. Flavour very sweet. Mid-season. Has carried heavy crops. Leaves large, dark, flat or slightly curled. Vigorous, rather straggling. 6 feet. Young canes strong, downy, few very small dark spines. Winter canes brown. Raised and introduced by Mr. W. F. M. Copeland.

**SUPERLATIVE** (*Millar*).—Berries medium, conical, dark red, firm. Flavour good. Mid-season. Has cropped well. Leaves large, rugose, much curled under. Moderately vigorous. 4 feet 6 inches to 5 feet. New canes few, stout. Winter canes red-brown. Raised by Mr. Merryfield, Dover, and introduced by Messrs. Bunyard in 1888. Awarded F.C.C. 1888, but now passed over by the judges as not of equal value to those receiving awards in the present trial.

**SUPREME** (*Gibson*).—Berries mostly small, round or bluntly conical, dull red, fairly firm. Flavour fair. Mid-season. Has cropped heavily. Leaves large, dark. Vigorous. 6 feet. New canes many, strong, upright, with sharp, dark spines. Winter canes brown. Raised by Mr. J. O. Gibson, Larklands Nursery, Ilkeston.

**TAIT'S SEEDLING** (*Tait*).—Berries large, long, conical, bright red, rather soft, often breaking up when gathered. Mid-season. Cropped fairly well. Leaves large, flattish. Vigorous. 7 feet. New canes many, very strong, almost spineless. Winter canes deep brown. Raised ('Superlative' × Raspberry seedling) by Mr. J. Tait of Justicetown Gardens, Carlisle.

**VICTORY** (*Fiddick*).—Berries medium, conical, dull red, rather soft, often breaking up when gathered. Flavour sweet. Has cropped moderately well. Mid-season. Leaves dark, broad, rugose, curled under. Moderately vigorous. 4 feet 6 inches to 5 feet. New canes few, upright, sparsely spined. Winter canes reddish. A chance seedling found by Mr. J. E. Fiddick of Golant, Par, Cornwall. Has many of the characteristics of 'Superlative,' from which the raiser notes that it may have originated.

**WHITE LEGS** (*Simpson*).—Berries medium to small, roundish, bright red, soft. Flavour fair. Early. Has cropped moderately well. Leaves large, flat, broad. Vigorous, straggling. 6 to 7 feet. New canes many, much pale "bloom," dark spines. Winter canes brown. Raised ('Superlative' × unknown variety), and introduced by Mr. W. Simpson.

**WM. PORTER** (*Artindale*).—Berries small, round, rather soft, dull red. Flavour fair, acid. Early. Has cropped fairly well. Leaves dark, flat or slightly down-curved. Very dwarf growing. 3 feet. New canes few, dwarf, sturdy. Raised by the late Mr. Wm. Porter, Boston, and introduced by Messrs. Artindale, Boston, Lincs. The stock contained a yellow-fruited rogue.

#### SUMMER-FRUITING. YELLOW.

**AMBER QUEEN** (*King's Acre, Harraway*).—Berries medium, round or bluntly conical, amber. Flavour sweet; very good. Mid-season. Has cropped well. Leaves rugose, broad, often down-curved. Moderately vigorous. 4 to 5 feet. New canes many, stout, green, with pale "bloom." Raised and introduced by Messrs. Harraway, Warminster.

**YELLOWHAMMER** (*Laxton*).—Berries medium, round, firm, pale yellow. Flavour sweet, good. Mid-season. Leaves flattish, rugose. Vigorous. 6 feet. Has cropped heavily. New canes strong, tall, pale green, almost spineless. Raised and introduced by Messrs. Laxton, Bedford.

#### PERPETUAL-FRUITING (SUMMER AND AUTUMN). RED.

**BALLINGTON'S BOUNTIFUL** (*Ballington*).—Berries large, round, dull red, rather soft. Flavour sharp, acid. Cropped heavily in summer, lighter in late summer and autumn. Leaves flattish. Very vigorous. 7 to 8 feet. New canes many, strong, straggling, greenish, with pale "bloom." Raised and introduced by Mr. H. Ballington, Matlock.

**GORDON PERPETUAL** (*Gordon*).—Berries large, roundish, dark red, often breaking up when gathered. Flavour good. Cropped well in summer, few berries later in season. Leaves flattish, broad. Moderately vigorous. 5 feet. New canes many. Introduced by Messrs. Gordon, Stirling.

**INGALL'S PROLIFIC** (*Ingall*).—Berries medium to small, round, dull red, firm. Flavour sweet, good. Cropped well in summer, moderately later. Leaves flattish. Of medium vigour. 4 to 5 feet. New canes many, sturdy. Winter canes brown. A chance seedling introduced by Mr. W. Ingall of Priory Gardens, Grimoldby, Louth.

STORRIE'S EXCELSIOR PROLIFIC (*Storrie & Storrie*).—Berries large, roundish conical, firm, deep red. Flavour good. Cropped well in summer, ripening early, and moderately well in early autumn. Leaves rugose, flattish or slightly downcurled. Vigorous. 6 to 7 feet. New canes many, strong, downy, with pale "bloom." Raised and introduced by Messrs. Storrie & Storrie, Glencarse.

THE MAXTONE (*Read-Andrews*).—Berries large, roundish conical, bright red, rather soft, often breaking up when gathered. Flavour sharp, acid. Cropped moderately well in summer, but lightly in late summer and autumn. Leaves flattish, often slightly downcurled. Vigorous. 6 feet. New canes rather sparsely produced, sturdy. Winter canes deep brown. A chance seedling introduced by Mr. T. M. Read-Andrews of Peartree Nursery, Bulphan, Essex.

## TURNIPS AT WISLEY, 1925.

THE season of 1925 was not very favourable for a trial of Turnips, on account of alternating periods of dry and of wet weather. The roots grown were often not as shapely as is usual, and so badly were the Swede-turnips affected that report upon these is held over.

The Fruit and Vegetable Committee examined the trial in season and selected the truest stocks of the most useful Turnips for award, as is shown below.

Several sowings of each variety were made, and the particular season of usefulness is indicated in each case.

## AWARDS, DESCRIPTIONS, AND NOTES.

## LONG VARIETIES.

The varieties grouped first have swollen roots much longer than broad, and either tapering like most parsnips and long carrots, or ending abruptly like a half-long carrot.

## FLESH WHITE.

*Skin white throughout.*

JERSEY NAVET (Barr).—A variety coming quickly into use (seven weeks in summer), with half-long cylindrical roots somewhat swollen at the end, tender and of very fair quality, forming a medium-sized plant, good for forcing.

EARLY-LONG FORCING (Carter).—Very similar to 'Jersey Navet.'

*Skin reddish-purple at top.*

NAVET DES VERTUS (Carter).—A little longer in maturing than last, but still a good early variety, with long tapering roots, fairly juicy, with rather large foliage. Also known as 'Red-topped Vertus.'

\* \* \*

OSTERSUNDOM MEDIUM (Wiboltt).—A tankard-shaped root about 4 inches wide and 6 inches long, half out of soil. Plant tall; foliage large, crumpled. Coming near 'Red Globe' type in character and season, but more cylindrical.

*Skin blackish throughout.*

LONG BLACK SUGAR (Carter).—A good even stock of a tapering rooted turnip, 8 inches long,  $2\frac{1}{2}$  inches wide, with large dark-green lobed leaves. Flesh white, fairly juicy. A variety grown in India for table use. Turning in fairly quickly (nine weeks), but needs to be sown by the beginning of August.

## FLESH YELLOW.

*Skin green at top, yellowish below.*

YELLOW TANCARD (Wiboltt).—An even stock of a turnip with cylindrical roots about 8 inches long,  $2\frac{1}{2}$  inches wide. Leaves large, lobed; plant 18 inches high. Later than foregoing, and apparently different from the English 'Yellow Tankard.'

*Skin creamy-white throughout.*

FUNISH BORTFELDER (Wiboltt).—Similar to last except in skin colour.

## ROUND OR FLAT VARIETIES.

The varieties grouped here have roots about as long as broad or broader than long. They vary in season and in colour, as is indicated below.

## FLESH WHITE.

*Skin white throughout.*

WHITE MILAN (Carter, Cooper-Taber, Nutting) } A flat-rooted turnip about  
 EARLY WHITE MILAN (Barr, Webb, Kelway) } 4 inches across,  $2\frac{1}{2}$  inches  
 EXTRA EARLY MILAN (Veitch) } deep. Leaves shining green,  
 entire. Roots smooth white throughout, mild in flavour. A very early turnip  
 ready six to seven weeks from sowing in summer, and useful also when sown in  
 mid-August.

Of the foregoing stocks the most regular were 'White Milan' (Cooper-Taber) and 'Extra Early Milan' (Veitch), both of which were given the award C. Oct. 9, 1925.

\* \* \*  
 EARLY WHITE DUTCH (Dobbie) } C. Oct. 9, 1925.—A turnip with  
 WHITE FLAT DUTCH (Daehnfeldt & Jensen) } roots about twice as broad as  
 deep, often rather lobed in outline. Foliage lobed. Later than the last and  
 less good for late August sowing. Quality good; roots white throughout.

Both stocks were even and true.

WIBOLTT'S WHITE FLAT (Wiboltt) probably belongs here, but was irregular in form and size.

\* \* \*  
 IMPROVED WHITE FLAT DUTCH (Olsen).—In season like the last, but with rather larger leaves, entire. An irregular stock in shape and size. It matured sufficiently from late August sowings.

\* \* \*  
 SNOWBALL (Nutting, Wiboltt, Daehnfeldt & Jensen) } A white turnip about as deep as  
 VEITCH'S MODEL or SNOWBALL (Veitch) } broad, nearly spherical, smooth  
 EARLY SNOWBALL (Kelway) } and with about 80 per cent.  
 COVENT GARDEN SNOWBALL (Barr) } above ground. Foliage shining  
 IMPROVED SNOWBALL (Olsen) } green, lobed and large, the plant  
 MODEL (Watkins & Simpson, W. H. } being about 12 to 15 inches tall.  
 Simpson) } Roots  $3\frac{1}{2}$ –4 inches across, of good  
 MODEL WHITE (Cullen, Dobbie) } quality. Ready for use in 9 weeks  
 EARLY WHITE MODEL (Barr) } from sowing and turning in well  
 EXHIBITION (Harrison) } from mid-August sowings.

The most regular stocks selected for award were 'Snowball' (Wiboltt and Nutting); 'Veitch's Model' (R. Veitch); 'Covent Garden Snowball' (Barr); 'Improved Snowball' (Olsen); 'Model' (Watkins & Simpson and W. H. Simpson); 'Model White' (Cullen, Dobbie). These share the award of H.C.

\* \* \*  
 EARLY WHITE GLOBE (Cooper-Taber).—Characters of above, but roots longer than broad and tapering at base.

\* \* \*  
 EARLY WHITE GLOBE STRAP-LEAVED (Cooper-Taber), C. Oct. 9, 1925.—Roots more spherical than last, of same season. Leaves entire. Did not mature from mid-August sowing.

\* \* \*  
 LITTLE MARVEL (Carter, Barr).—A smaller, flatter turnip than 'Snowball,' but the stocks sent were irregular. Foliage shorter, smaller.

\* \* \*  
 EARLY WHITE STONE (Barr).—A still smaller variety, roots about  $2\frac{1}{2}$  inches across, fairly quick to mature and useful when sown in mid-August. Leaves lobed. Root buried about one-third; both skin and flesh white.

SILVER BALL (Webb).—Much like 'Early White Stone.'

*Skin green at top.*

MANCHESTER MARKET (Dickson & Robinson, } An almost spherical turnip  
 Carter, Barr) } with very firm white flesh and  
 MARBLE (Harrison) } a green top. Foliage large,  
 PRIZETAKER (Webb) } dark dull green. Roots about  
 $4\frac{1}{2}$  inches across and two-thirds out of the soil. Matures in about nine weeks  
 from sowing in summer, but did not turn in from mid-August sowing and is apt  
 to run in early spring. It is reputed more hardy than the next, and like it will  
 stand a good deal of rough usage without damage.

The stocks sent were true and even.

\* \* \*



GREEN-TOP STONE (Barr, W. H. Simpson, Cullen, Cooper-Taber) } Much like the last, but somewhat taller and perhaps a little more buried in the soil. Season the same as last. Both are best used when young.  
 GREEN-TOP OF GARDEN STONE (Veitch)  
 STONE GREEN-TOP (Kelway)  
 GREEN-TOP SIX WEEKS or STONE (Carter)  
 Of these 'Green-Top Stone' (Barr, W. H. Simpson, and Cullen) and 'Stone Green-Top' (Kelway) were given award of C. Oct. 9, 1925.

\* \* \*

LARGE GREEN GLOBE (Carter) was mainly like the last, but was mixed.

*Skin reddish throughout.*

CARTER'S CRIMSON BALL (Carter).—A small, flat turnip with reddish roots  $2\frac{1}{2}$  inches wide and  $1\frac{1}{2}$  inch thick. Foliage dark, lobed, small, the whole plant being only 6 to 9 inches high. Roots fairly smooth, flesh white, of good quality. Summer sown turned in in eight weeks, but sown in mid-August it failed to mature. Introduced by Messrs. Carter in 1884, this is a turnip grown considerably in India and Japan.

SCARLET STONE (Carter).—Said to be selected from a variety called 'Kashymir' and introduced from Holland; proved to be too much like the preceding.

*Skin reddish-purple on top.*

PURPLE-TOP MILAN (Cooper-Taber)  
 RED-TOP MILAN (Carter)  
 MILAN EARLY-PURPLE STRAP-LEAVED (Nutting)  
 EARLY MILAN (W. H. Simpson, Dobbie)  
 EARLY RED MILAN (Kelway, Webb) } The counterpart of the 'White Milan,' but with reddish tops to the roots, equally quick to mature and good in flavour. Useful both for early and late sowing. Foliage small.

The truest and most regular stocks among the foregoing were 'Red-Top Milan' (Carter) and 'Early Red Milan' (Kelway and Webb). These were given H.C. Oct. 9, 1925. 'Early Milan' (Simpson and Dobbie) was given C.

\* \* \*

RED AMERICAN STRAPLEAF (Carter)  
 PURPLE-TOP STRAPLEAF (Kelway, Daehnfeldt & Jensen)  
 AMERICAN PURPLE-TOP (Wiboltt)  
 IMPROVED PURPLE-TOP MILAN (Olsen)  
 IMPROVED PURPLE-TOP STRAP-LEAVED (Olsen) } A rather larger turnip with larger foliage than the last, taking some days longer to turn in, but useful also for late August sowing. A turnip good for hot dry seasons and soils. Much grown in America. Most of the stocks were even. There was some difference in the time of maturity of some of these stocks, the Continental ones being later, and there may be a corresponding difference in strains.

\* \* \*

EARLY PURPLE-TOP (Webb)  
 EXTRA EARLY PURPLE-TOP (Barr) } A flat turnip with roots similar to the Purple-top 'Milan' and equally useful for early and late sowing, but with larger lobed leaves. Stocks not quite true.

\* \* \*

RED GLOBE (W. H. Simpson, Barr)  
 RED GLOBE SELECTED (Dobbie)  
 VEITCH'S RED GARDEN GLOBE (Veitch)  
 VEITCH'S RED GLOBE (Cullen) } A red-topped, white-fleshed turnip, often rather deeper than broad, turning in about nine weeks from sowing in summer, but not to be relied upon from mid-August sowings. Foliage large, lobed, medium green. Plant about 16 or 17 inches tall. Roots half out of soil, of fair quality. The stocks varied somewhat in shape, some (Simpson's, Dobbie's, and Cullen's) being rounder than others, and the variety evidently may give rise to sub-varieties, of which

IMPROVED RED GLOBE (Carter) and  
 COOPER'S EARLY RED-TOP GLOBE (Cooper-Taber),  
 the former of the longer, the latter of the shorter type, were both some days earlier to mature than the stocks first mentioned.

All the foregoing stocks of 'Red Globe' with the exception of the first two were H.C.

\* \* \*

IMPROVED WHITE GLOBE, RED-TOP (Olsen) was a fairly round stock of 'Red Globe' type, but very slow to mature, and

WHITE GLOBE (Wiboltt) was an irregular stock of this type with long, narrow roots, almost coming into the long types.

*Skin blackish.*

CHIRK CASTLE (Cullen, W. H. Simpson, Carter) } All H.C.—A globular turnip, slow to mature but reputed very hardy, with very firm white flesh. Foliage large, lobed, dark dull green. Roots  $3\frac{1}{2}$  inches across. Grown more in the north than in the south of England, and of little use for sowing here after mid-July.  
All stocks were good and even.

## FLESH YELLOW.

*Skin yellow.*

GOLDEN BALL (Cooper-Taber, Kelway, Cullen, Daehnfeldt & Jensen, W. H. Simpson, Watkins & Simpson, Dobbie, Wiboltt)	{	An almost spherical turnip $3\frac{1}{2}$ to 4 inches in diameter, yellow both in flesh and skin, about two-thirds buried. Foliage dark dull green, large, lobed; plants about 18 inches in height. Rather slow to mature (about ten weeks in summer) and needs sowing for winter by about the beginning of August.
IMPROVED GOLDEN BALL (Olsen)		
VEITCH'S GOLDEN BALL OR ORANGE JELLY (Veitch)		
ORANGE JELLY SELECTED (Barr)		
ORANGE JELLY OF GOLDEN BALL (Webb)		

All these stocks with the exception of Messrs. Veitch's were Commended Oct. 9, 1925.

\* \* \*

GOLDEN STONE (Cullen).—A little larger than the last and of a paler colour, both in flesh and skin.

\* \* \*

GOLDEN ROSE (Carter), C. Oct. 9, 1925.—Roots more conical than in 'Golden Ball,' and perhaps a little deeper in colour. Top and season the same.

\* \* \*

YELLOW FINLAND (Nutting).—A small, rather flat root, about 3 inches wide by 2 inches deep and mostly below ground. Foliage small and plant only about 9 inches in height. Flesh and skin yellow. Juicy and of good quality when young. Mature in about nine weeks in summer, but does not turn in sufficiently quickly for mid-August sowing.

*Skin green at top.*

ALL THE YEAR ROUND (Carter).—Characters of 'Golden Ball,' but with green top.

\* \* \*

ALL THE YEAR ROUND (Dobbie).—Like the last, but much paler in flesh and skin.

\* \* \*

YELLOW GREEN-TOP (Barr).—Much like the paler form of 'All the Year Round,' but smaller.

\* \* \*

GOLDEN NUGGET (Barr)	{	The green-topped counterpart of 'Yellow Finland,' with the same season. Originated in Finland. Messrs. Carter's stock was Commended Oct. 9, 1925.
GOLDEN SUNRISE (Carter)		

\* \* \*

DALE'S HYBRID (Wiboltt).—An almost spherical root about half out of the ground, with yellow flesh. Foliage large; plant about 18 inches high. Stock irregular.

*Skin streaked purple-red all over.*

YELLOW MALTESE IMPROVED (Carter), C. Oct. 2, 1925.—A flat-rooted turnip about  $3\frac{1}{2}$  inches wide and 2 inches deep, with two-fifths above the soil. Foliage small, dark dull green, lobed. Plant of about 10 inches. Flesh firm, yellow, and quality good. Taking about nine weeks to mature, it is not suitable for sowing after the beginning of August. A good even stock.

## BOOK REVIEWS.

"Garden Craftsmanship in Yew and Box." By Nathaniel Lloyd. Sm. 4to. 36 pp. 54 plates. (Benn, London, 1925.) 15s. net.

For those who have a taste for topiary work this book will be instructive and helpful in that the author gives complete and careful details as to how hedges and such-like should be planted and cared for, but it is pleasant to see that he recommends "restraint" in the use of this art—if art it be.

The only reason we like these mutilated things at all is because we have become used to them as legacies of bygone days, like the Lord Mayor's Show, which is treated with tolerant amusement; and it should be borne in mind that most of the ancient specimens have overgrown their original idea and design, and nowadays are mere monstrosities.

For protection and enclosure a clipped evergreen hedge if formed in geometrical design can be at once a good background for flowers and a pleasing ornament in itself, but the shapes that are so frequently met with tend to belittle the topiary craft, and the peacefulness and repose of a garden is often very much destroyed. Such things as teapots, sitting birds, figures, rampant teddy bears, etc., should be avoided, and it is here that good taste is needed.

The book contains 54 photographic plates, many of which will serve as a warning. Yes, restraint is certainly to be recommended.]

"Fruit-Growing Do's and Don'ts." By J. Turnbull. 8vo. 56 pp. (Methuen, London, 1925.) 2s. 6d. net.

This book is one of a series which is concerned with the giving of advice and admonition ranging from social subjects to pig-keeping. In the course of its fifty-six pages much good counsel is given, but some of the statements are quite inaccurate, as, for instance, that Peaches and Nectarines are usually grown on stocks raised from peach stones (on page 9). The statement that there is no British dessert apple of value for use after Christmas is a libel on our most useful fruit, and one which the market prices quoted in any fruit journal will disprove.

"Systematic Pomology." By U. P. Hedrick. 8vo. 488 pp. (Macmillan, New York, 1925.) 17s. net.

Books upon Systematic Pomology are not too plentiful, and in recent years it has been left to America to provide them. Dr. Hedrick's is the latest addition, and it will be of use to students, especially in the New World.

The first chapters deal with the value of roots, stems, leaves, etc., for diagnostic purposes. Following these comes a discussion of each kind of fruit, its habit, history, and course of development. This follows the lines laid down in the author's "New York" series of fruits, but of course in less detail.

About half of the book is occupied by descriptions of various fruits, and in view of the fact that they are a repetition of the descriptions in the author's recent "Encyclopedia of Fruits" those with limited shelf room will grudge this space, and the high price of the book adds emphasis to this point. Dr. Hedrick essays keys to the varieties described, and in apples follows Wardey in making flavour—sweet or sour—his first division, following by season of ripening, colour, shape, and then length of stem. The European reader will come across many points which will give some surprise—for example, to learn on p. 14 that "European Gooseberries are stocky and upright" as compared with the American varieties. A reference to European catalogues would have showed frequent use of the word "drooping" or "spreading" as applied to British varieties. A tinge of amusement will be experienced by the announcement of Shaw's "discovery" that fruit trees can be identified by leaves alone, this knowledge having been a commonplace of nursery work in Europe for several centuries. A great deal of so-called discovery in recent years is analogous, and consists of the non-gardener's surprise by his first impact with facts that every working gardener has long known, coupled with the apparent assumption that horticulture has no history.

A few omissions in the descriptive chapters may be noted. Chapter IV, on Buds, contains no reference to their taxonomic value; Chapter V, on Leaves, does not distinguish between spur and shoot leaves; on p. 53 the remarks on length of stems do not contain a reference to the variation in one variety due to the

flower being on the main axis or laterally borne. On p. 66 a heading "Calyx-tube and styles" is given, but contains no reference to different forms of styles which are of some importance diagnostically.

It is curious to find no mention of *Malus prunifolia* among the probable parents of the Apple, nor the fact that many of our Crab Apples descend from this species and not from *M. baccata*. The author goes very warily in not admitting more than two European species as parents of the Western Asian and European Pear. Koch's ideas might at least have been quoted.

Taken as a whole this work should fulfil its object as a class textbook for American students.

"Manual of Tree and Shrub Insects." By Ephraim P. Felt. 8vo. 382 pp. (Macmillan, New York, 1924.) 16s. net.

This volume of the Rural Manuals must prove of the greatest service to all who grow trees and shrubs in America. The British gardener will look through it with a growing sense of gratitude that he has not to fight the hosts of insects it describes. If he should have a taste for entomology as well, he may regret that such grand insects as the giant silkworms and hawk moths do not haunt his garden, and would not be entirely annoyed at the prospect of the Camberwell Beauty attacking his elms. The 256 illustrations are excellent, whether from photographs or drawings of the insects and their work.

It is fortunately unlikely that we shall need the services of this well-written book, or be obliged to resort to dusting trees with powdered arsenate of lead from aeroplanes, as is recommended for destroying the Catalpa sphinx in Ohio. Yet there is much of interest to be learnt from its pages, and much to admire in its method and thoroughness.

"British Weeds. Their Identification and Control." By R. Morse and R. Palmer. 8vo. 207 pp. (Benn, London, 1925.) 10s. 6d. net.

This well-produced book aptly fulfils its purpose, and provides a concise and accurate guide to the identification and control of our weeds. It does more than this by calling attention to the wickedness of weeds, not only as robbers of the food intended for other plants, but also as providing breeding grounds for some of their most noxious fungous and insect enemies. Appendix III lists thirty-two plants which serve as hosts for Aphides, Rusts, Mildew, etc., attacking cultivated plants. The short chapter on alien weeds is interesting and illuminating, as showing that many of our most troublesome weeds are of foreign origin, and might have been stamped out if attacked at their first appearance.

The grouping first by colour of flowers and then by easily recognized characters should form a useful key for those without botanical training. The main body of the book is arranged in four sections, dealing respectively with weeds of (1) arable land; (2) meadows and pastures; (3) lawns, garden paths, etc., and (4) water weeds. The plants themselves are arranged alphabetically according to their English names in these four sections. There are seven photographic plates showing interesting forms or diseases of weeds. The thirty-two figures in the text are outline drawings and show clearly the characters of the species illustrated.

"Plant Life on East Anglian Heaths." By E. Pickworth Farrow, D.Sc. 8vo. 108 pp. (University Press, Cambridge, 1925.) 7s. 6d. net.

This book contains an account of observations and experimental work relating to the ecology of the vegetation of the sandy and dry district known as the "Breck Country."

Caversham Heath has been selected for the experiments, and its Calluna, grass, *Carex arenaria*, bracken, and other plant associations have been carefully observed.

Rabbit-proof cages have shown that the rabbit is one of the most potent factors in reducing the number of species of plants. *Pteris Aquilina* kills its competitors mainly by means of its fallen-over dead fronds. A row of pines will check the rhizome spread of *Carex arenaria* by means of the layer of fallen pine needles.

The effects of additional water and manure and the part played by blowing sand have been carefully investigated and recorded. The photographs are excellent and show clearly the associations or changes described in the text.

Though there is little in this book that appeals to the ordinary gardener, the thoroughness of the work and the light thrown on plant behaviour under peculiar circumstances will afford interesting reading for all students of plant life.

"Gardening in Sunny Lands: The Riviera, California, Australia." By Mrs. Philip Martineau. 8vo. 296 pp. (R. Cobden-Sanderson, London, 1924.) 15s. net.

This is a very readable and interesting volume. The authoress is far too modest in her "Foreword," as it is much more than an elementary handbook, and it might well be for some years to come the most useful work for those about to begin gardening on the Riviera or other parts of Europe where the climatic conditions present many difficulties and where those of soil, water, labour, etc., often prove wellnigh insurmountable.

Much useful information is given on the question of water supply, irrigation, shelter from sun and wind—all of which will be helpful to a beginner.

A few of the best gardens on the Riviera are described, and many of the most notable plants grown there are referred to. The authoress is desirous, however, that this favoured region should show greater variety, and many suggestions are given. Her visit to California convinced her that many of the native Californian plants would succeed admirably in the warmer parts of Europe and help to relieve the monotony of Palms, Agaves, and like plants. The chapter on the gardens of California is a most interesting one, and not a few of the plants mentioned as seen both in gardens and in their native habitat would be welcomed here as well as on the Riviera.

The Glossary of Gardening Terms given both in English and French is a novel idea, and would be of great service to the beginner who has little knowledge of French.

The book is well illustrated. One picture shows a truly remarkable group of *Echium Wildpretii* (the specific name of which, we notice, is wrongly spelt).

"Grass." By A. J. Macself. 8vo. 204 pp. (Palmer, London, 1924.) 15s. net.

This book claims to be a thoroughly new and practical work for all purposes. It may be said to justify its claim, but that does not mean to say that after reading it our knowledge of lawns and grasses is complete. There are still many questions one wants to ask.

At an early stage the author complains that the public are quite content to buy the ordinary grass seed mixture of the seedsmen, and that few seedsmen have made any special study of grasses. This is very true, and after a dozen pages are devoted to a description of the various species of lawn grasses we are left in the same position as before, as no hints are given as to how the various species recommended should be proportioned. It is not unreasonable to expect that the author should have provided a suitable table of species and the correct quantity of each for, say, a clay soil and a sandy one.

Chapters dealing with the preparation of the soil, sowing, after-care, etc., are quite sound and may be read with profit.

A good deal is said for the worm which probably would not be acceptable to our expert golf and tennis-green keepers.

Returfing is dealt with, but the author does not mention the method now being employed; instead of laying full-sized turves they are broken into small pieces, set down several inches apart, and the spaces between filled in with fresh soil. This is a first-rate plan, as it gives the turf a new lease of life and provides a vigorous lawn in a few weeks, and in addition effects a great saving in turf.

On page 54 it is said feeding will eliminate undesirable grasses in pleasure lawns. It would have been interesting to know exactly what manure will encourage, say, *Poa nemoralis* to the detriment of Cocksfoot, but this is not revealed.

Weeds and insect pests are dealt with very fully and clearly—better than in most works on the subject—and within its pages there is much general information that will be appreciated by those interested in this important subject.

"The Gardener: A Book of Brief Directions for the Growing of the Common Fruits, Vegetables, and Flowers in the Garden and about the House." By L. H. Bailey. 8vo. xii + 260 pp. (Macmillan, New York, 1925.) 8s. 6d. net

"The same questions are asked every year, and they always will be asked—the questions about the simplest garden operations. Upon this desire for commonplace advice the horticultural journals live. A journal which publishes only things that are new would find little support. Some of these common questions I have tried to answer in this little book."

This book is to displace the same author's "Practical Garden-Book." "It considers only the growing and care of plants," and it deals with this well.

Plants common in gardens are taken *seriatim* and alphabetically and described briefly, their requirements being clearly set down and all without unnecessary verbiage. Fruits, vegetables and flowers are all included. The selection of plants is naturally not the same as it would have been if the book had been made in England, but nevertheless English gardeners may consult it with profit. They will find therein only four Primulas, no Saxifrages, few Rhododendrons, no heaths, and indeed few shrubs of any kind, and that is probably because American gardening is rather new on the whole, but there is a vast amount of information within the covers of the book.

The author deplores the fact that whereas there are in America Iris, Pæony, Chrysanthemum, and Dahlia Societies, there is no Apple Society. May we not also deplore the fact, for it is true here too!

"A Class Book of Botany." By Ernest Stenhouse, B.Sc. 514 pp. (Macmillan & Co. Ltd., London, 1925). 7s. 6d. net.

Botany is a subject the study of which demands experiment and observation. However attentive to lectures and assiduous in the perusal of textbooks the student may be, it is only with the aid of practical work that he can become well acquainted with the facts of plant life. With this idea in mind, the author of "A Class Book of Botany" has drawn up a scheme intended primarily for the use of students preparing for University matriculation, school certificates, Senior Local, and other examinations of similar standard. The many experiments are of real value and can be performed with simple apparatus and such material as is easily obtainable. It is suggested that a certain amount of the practical work be done in the field, and the excellent chapter on ecology should help towards a wider view than can be formed in the laboratory.

At the end of each chapter is a selection of recent examination questions, and at the end of the book are a full index and lists of flowers and other material available during the several seasons. The illustrations include many half-tone reproductions and clear diagrams.

The book should be of the greatest use to both teacher and student.

"An Introduction to Plant Anatomy." By Arthur J. Eames and Laurence H. MacDaniels. 364 pp. (McGraw-Hill Publishing Co. Ltd., London, 1925.) 17s. 6d. net.

The object of the authors of this textbook of anatomy has been to provide a work which should serve both as a guide to the student beginning anatomical study and as a reference text for workers in fields of applied botany. To meet the needs of the student it is necessarily of an introductory nature. The treatment is, nevertheless, comprehensive; and, in case the need for further information should be felt, a short list of references is given at the end of each chapter to the subject-matter contained therein.

The book deals with the vascular plants only and, after an introductory chapter, is divided into five sections, viz.: General Histology; The Primary Body; The Secondary Body; The Organs; and special chapters. The special chapters are two, the first being devoted to Ecological Anatomy, under which heading the structure of Xerophytes, Hydrophytes, Epiphytes, etc., is considered, while the second gives an interesting sketch of plant anatomy.

The book is well written and well illustrated. Most of the numerous text-figures are original drawings, and there are also some excellent half-tone plates from photomicrographs.

"A List of British Aphides." By J. Davidson. ix + 176 pp. (Longmans, Green, London, 1925.) 12s. 6d. net.

This book is the first of the Rothamsted Monographs on agricultural science dealing with entomology. It is divided into four parts: (i) Species List; (ii) List of Genera; (iii) Food Plant List; and (iv) Bibliography.

The list includes 397 valid species together with 178 synonyms. The plant genera number about 300, many of the better known plants being double indexed under their scientific and common names.

The author has collected together all published data on the British species of the group 'Aphidoidea,' and the work was necessary as Buckton's list required revising and bringing up to date.

One entirely agrees with the author in deploring the scarcity of county records, which are at present very incomplete and often give a distorted idea as to the distribution of species. It is urged that collectors should publish records of locality and food plants in order to accumulate data which would

be of the utmost value in the elucidation of problems dealing with this widespread group of insects. It behoves, therefore, all workers in entomology, especially those attached to various agricultural and horticultural institutions throughout the country, to record the presence of any member of the family 'Aphidoidea,' so that a future edition of this book may contain more comprehensive county lists.

It is hoped also that in a second edition the bibliography may be enlarged.

This is a book for the specialist, and will be welcomed by all workers in entomology.

"Some Other Bees." By Herbert Mace. vi + 160 pp. (Hutchinson, London, 1925.) 4s. 6d. net.

The title of this excellent book is misleading, for the chapters on Bees take up about forty pages. The rest of the book is devoted to Lepidoptera under five section headings: (ii) The Idiosyncrasies of Butterflies; (iii) Fritillaries; (iv) The Butterfly as Traveller; (v) The Wonderful Hawk Moths; and (vi) The Evolution of the Caterpillar.

The photographic plates are good, with the exception of two (facing pp. 16 and 96 respectively) where the reproductions are such that identification of the species is impossible.

In the first part there are chapters on Indian species of honey bees, humble bees, carpenter and mason bees, leaf-cutters, and a general account of the order 'Anthophila.'

The next two parts should be read by all interested in butterfly lore, for the author's remarks are based on a series of observations made over a number of years.

Part IV deals with the butterfly as traveller, and includes chapters on migration, British migrants, and the question of whether certain species return to their country of origin. It is stated that the principle underlying migration is lack of food, but that this is not always the case is proved by recent work carried out in parts of South Russia and Asia Minor on the conditions influencing the migration of locusts.

A chapter is devoted to desert butterflies and a general survey of the part that colour plays in making a species conspicuous or difficult to discern.

Part V reviews the order 'Sphingidae,' whilst the final part deals with protective coloration and various forms and habitats of lepidopterous larvae.

This book is an incentive to the study of insect life, and the amount of information, a large part of which is not to be found in textbooks, crowded into its pages should give this volume a ready sale.

"Monocotyledons: a Morphological Study." By Agnes Arber. 8vo. 258 pp. (Cambridge University Press, 1925.) 21s. net.

The Monocotyledons have often been a favourite study of botanists. As a group, they are not so unwieldy that their main peculiarities are obscured by their diversities. The chief features of the evolution of their cohorts and orders seem reasonably clear. They can be morphologically compassed in some measure by the work of one individual. Mrs. Arber, who has been contributing for nearly a decade to the morphology of this group, has produced a fascinating book, in which her studies and those of others are summarized. This study in morphology leads to certain points of view, which are discussed in the later chapters.

In an interesting introductory chapter on the principles of morphology, the authoress points out that nearly every part of the plant, such as the gametophytes, the hypocotyl, the nodes and the peduncles, has been regarded by different botanists as peculiarly "conservative," because of surviving ancestral traits; and she takes the reasonable view that such traits may be found in any part of the plant sufficiently studied.

Later chapters deal with the root, the axis, the description and interpretation of the leaf, the prophyll, the seedling and the reproductive phase. In each of these chapters a selection is made of the topics and examples which have come particularly under her notice. Contractile roots, cambial activity and fenestrated leaves are among the many subjects which come in for consideration.

The phyllode theory of leaves is presented in convincing detail, and it is pointed out that A. P. De Candolle in 1827 was really the founder of the view that the monocotyledonous leaf is equivalent only to leaf-base and petiole. Mrs. Arber also accepts, somewhat hastily we think, Miss Saunders' leaf-skin theory of the shoot, a theory which does not appear to have the same sound morphological basis.

The last two chapters are of particular interest because of their philosophical

treatment. They deal with "Taxonomy and its Interpretation" and "Parallelism in Evolution." Among the modern evolutionary views, Mrs. Arber chooses an interesting array of conceptions and applies them to the evolution of the group. She lays stress upon the non-adaptive nature of specific characters, and points out how differences which distinguish large groups may in certain instances occur within a single species. She shows, using the Araceae as an example, how frequently evolution has taken the direction of reduction and simplification; and she is led to the somewhat extreme view that the cohorts of Monocotyledons all probably trace back to separate origins. The discussion of parallelism in evolution, which, in its modern guise, has grown out of the experimental work with mutations, leads her to the view that the tendency to progress in a certain direction is inherent in the race.

No botanist will be likely to agree with *all* the views expressed, but every one will find the book a most useful and stimulating addition to his library.

"Dictionary of Botanical Equivalents." German-English, Dutch-English, Italian-English by E. Artschwager, and French-English by E. M. Smiley. Ed. 2. 8vo. 124 pp. (Williams & Wilkins, Baltimore; Baillière & Tindall, London. 1925.) 16s. 6d. net.

The first edition of this high-priced little book was noticed in our JOURNAL, vol. 48, p. 98. It has been reduced in size, but now includes Dutch and Italian terms as well as German and French, and many blank pages (not included in the 124). There is still an overwhelming preponderance of German terms, but a greater selection of French than in the first edition, making the book more useful than its predecessor.

"Genetics in Plant and Animal Improvement." By Donald Jones. 8vo. viii + 568 pp. (John Wiley, New York; Chapman & Hall, Ltd., London. 1925.) 20s. net.

The author states that this book has grown out of a course of lectures, and is designed primarily as a textbook for the first course in Genetics. In our opinion it is well adapted to meet the object the author has set out to attain. There is nothing particularly new in this book, but beginners will find it useful, and it is not too advanced for the general reader. The book is divided into fifteen chapters, covering a wide range. In Chapter V the author has dealt with chromosomes as carriers of inheritance in a very lucid and helpful way. An illustration of factors transmitted together is given in Bateson's work with Sweet Peas; Morgan's work with *Drosophila* is also explained, and a table is given at the end of the chapter showing the number of chromosomes contained in some of the common plants and animals.

On page 134 in Chapter VI the modification of sex by internal secretions is touched on, and it is stated that when twins of both sexes are produced simultaneously in cattle the female calves are regularly sterile. This may be the general rule, but it is not always so.

Chapter VII deals with variations, large and small, and chimeras, although we think it would have been better if the pages on chimeras had been arranged at the end of the chapter.

Chapter XIII is devoted to sterility, which is clearly explained. In Chapters XIV and XV the author discusses the methods for plant and animal improvement respectively. In the former chapter a good many pages are occupied with Indian corn experiments, but we think the chapter would have been improved if it had been shorter. As the book is designed primarily as a textbook, we think something should have been said about preparing flowers for hybridization, methods of protection, and the importance of strict cleanliness in the work, both with regard to mixture of pollen and the harvesting of seed. Several of the chapters have summaries which students will find useful.

The index to the references cited by the author shows the scope of his researches, and would be likely to prove useful to anyone in the future who wishes to discover at a glance what has already been done in this field.

There are numerous illustrations and diagrams, which are excellent, and the general index and glossary are also good.

We can commend this book to the student of Genetics and to the general reader.

"The Romance of the Fungus World." By R. I. and F. W. Rolfe. 8vo. xx + 309 pp. (Chapman & Hall, London, 1925.) 12s. 6d. net.

The authors have emptied their notebooks into this and crammed it with information about the fungi. They have searched out references in literature



and in the records of learned societies, have condensed and epitomized in popular language abstruse papers, and have produced from the hotch-potch a very palatable dish for the literary palates of the multitude. You may learn much from it, you may be entertained; and above all your appreciation of the marvels of the world around you will be heightened, for these are no half-apprehended truths strung together by hack-writers, but a lucid exposition of much of the lore that has accumulated concerning fungi.

"Native Orchids of Britain." By C. B. Tahourdin. 8vo. 114 pp. (Of the Author, 86 Manor Road, Wallington, Surrey.) 5s. 4d. post free.

In "Native Orchids of Britain" we have a work compiled by an amateur for amateurs. The author, Mr. C. B. Tahourdin, has been a student and lover of British Orchids since 1890, and the present book embodies something of a record of his own studies and experiences. The Orchids are enumerated in the order given in the 10th edition of "Babington's Manual of British Botany." With respect to *Orchis maculata*, which of late years has been prominently discussed, Mr. Tahourdin has adopted the views expressed by Colonel Godfrey and the two Drs. Stephenson. Therefore by *Orchis maculata* he means "the plant which for some time has been called *Orchis Fuchsii*, and by *Orchis elodes* the plant which was first separately noted as *Orchis maculata* var. *ericetorum* and later as *Orchis ericetorum*, and has also been referred to as *O. maculata praecox*." As regards the fifty-six illustrations, these have been made life-size whenever possible, although roots and leaves have been mostly omitted. In the majority of cases the illustration of the flowers, coupled with the written description, will be a sufficient guide to put students on the track of identifying the various species. The work contains a chapter on Hybrids, but the list of some of the crosses might be simplified for the benefit of the uninitiated amateur. Some abnormal forms are also illustrated and described. For some time past there has been a need for a book of this kind, and its success seems assured.

"Your Few Acres: How to Manage them for Profitable Production." By E. T. Brown. 8vo. xiii + 254 pp. (Chapman & Hall, London, 1925.) 10s. 6d. net.

Compact of useful information of cultivation and treatment of crops and stock on a small holding in which the owner desires to take delight, and giving details of buildings and their upkeep, this book will be found extremely useful by many.

The chapter relating to the garden and orchard occupies 46 pages, and while not much can be done to cover the ground in such small space, yet, as there is no padding, a considerable amount of information is conveyed.

"A Textbook of General Botany for Colleges and Universities." By R. M. Holman and W. W. Robbins. 8vo. ix + 590 pp. (Chapman & Hall, London, 1924.) 20s. net.

This appears to be an excellent textbook of botany for a general course, although it is doubtful whether the whole of it could be assimilated by an average student in a one-year course. The first part (pp. 49-318) deals with plant form and function, the second (pp. 319-570) with classification, evolution and heredity, while Chapters I and II, dealing with history and the structure of the cell, may be taken as introductory to both parts. The book is well illustrated and the illustrations are well labelled, so that the earnest student will find them extremely useful in elucidating the text, which is itself lucid. The only fear one has is that he may be tempted to use the illustration as evidence instead of the actual thing, and that temptation may lead to the development of an unscientific attitude of mind.

As is apparently inevitable in textbooks of science, this bristles with technical terms, and as they are printed in thick type with the laudable object no doubt of impressing them upon the reader's mind they are apt to create in the minds of a certain type of student the idea that in the use of these technical terms consists the whole of the science. The terms are, many of them, necessary for precision of expression, but the student needs to be impressed with the idea that behind the isolated fact which the term embodies lies something greater and of infinitely more importance, apt sometimes to be expressed by an epithet given merely as a cloak to ignorance. We do not say this because this book errs more than its fellows—indeed it is less guilty than many—but because we so often meet with this attitude of mind in students.

"The London Catalogue of British Plants, containing the British Phaenogamia, Filices, Equisetaceae, Lycopodiaceae, Selaginellaceae, Marsileaceae, Salviniaceae, and Charophyta. Adapted for marking desiderata in exchanges of specimens; for an index catalogue to British Herbaria; for indicating the species of local districts; and for a guide to collectors by showing the comparative rarity or frequency of the several species." Eleventh edition. 55 + 3 pp. 8vo. (George Bell, London, 1925.) 10d.

The eleventh edition of the London Catalogue has just been published, succeeding the tenth edition after seventeen years. The specialists who have contributed to certain critical genera are more numerous than before, and new helpers have been brought forward to replace the veterans who have passed away. The previous edition had 2,062 numbered species, the present extends to 2,362. Continued study has discriminated many species, varieties, and forms, as the critical faculty has become keener. The genus *Hieracium* has species of a lower grade than the rest, for the Rev. J. Roffey explains that in adapting Zahn's revision of the genus this course became imperative. Mr. W. H. Pearsall has revised the Batrachian forms of *Ranunculus*, Mr. Pugsley *Fumaria*, Mrs. Gregory part of *Viola*, and Dr. Drabble the remainder; the Rev. H. J. Riddelsdell is responsible for *Rubus*; *Rosa* fell to the care of Col. Wolley Dod; Mr. C. E. Britton revised *Centaurea*, Mr. Baker *Plantago*, Mr. A. B. Jackson *Thymus*, *Alnus*, and *Populus*, Mr. J. Fraser the genus *Salix*, Messrs. T. and T. A. Stephenson the *Orchidaceae*, the veteran Mr. Arthur Bennett *Potamogeton*, *Carex*, and the comital census, Mr. W. O. Howarth part of *Festuca*, and Mr. J. Groves and Canon Bullock-Webster the *Charophyta*. The index is now printed on white paper at the end instead of on the wrapper.

By an unfortunate printer's slip *Scorzonera* is put first under Campanulaceae instead of last under Compositae.

"Evolution, Heredity, and Variation." By D. Ward Cutler. Pp. 147. 8vo. (Christophers, London, 1925.) 4s.

A handy volume explaining the meaning of the words set out in the title in simple language with diagrams to aid in the explanation. A few technical terms such as linkage, crossing over, and the like, are used, but their meaning is made clear. The volume closes with a bibliography and index. It can be recommended as a useful exponent of modern views.

"Gardens—A Notebook of Plans and Sketches." By J. C. N. Forestier. 4to. 237 pp. (Scribner's, New York and London, 1924.) £2 12s. 6d.

Monsieur Forestier is chief of the parks of Paris, that is to say, one of the foremost of French *Architectes de Jardins*.

We have already had the pleasure of reviewing books by this talented artist, and can do little more than repeat the praise we have already given.

The volume before us (translated for American readers by Miss Helen Morgenthau Fox) gives an admirable résumé of the aims of French garden art of the present day.

There is a trace of the influence of Spain in the plans which are illustrated, but this is quite in accord with the technique of French gardening.

French and English landscape gardeners are agreed on the purpose of inventing one main pictorial composition, to which all details are subordinate. In this purpose Monsieur Forestier succeeds admirably. His plans are almost uniformly symmetrical, but it is the purpose of the artist to soften their formality by adroit use of planting and flowers, and to make them interesting to lovers of gardens as well as to those who merely appreciate good design.

Monsieur Forestier's plans are simple and direct, and indeed, as the translator says, "so like a perfectly written essay that they are instantly understood." At the same time they are full of such interest as can be given by terraces, benches, pools, walls, arbours, and garden ornaments, arranged with much facility of design and perfect technique. In studying them one feels sure that Monsieur Forestier is never at a loss for the correct answer to a difficult problem.

The illustrations are excellently executed, and the essays which accompany the plans are written with equal mastery on the horticultural and the architectural sides of the subject.

"Charles Eliot, Landscape Architect." 8vo. 770 pp. (Harvard University Press, Cambridge, 1924.) 21s. net.

It has been a misfortune for garden art in America that two of her most talented landscape gardeners should have died prematurely just on reaching the zenith of their professional success. A reprint of the writings of Andrew Jackson

Downing was reviewed in a recent issue of the Royal Horticultural Society's JOURNAL. We have now before us the excellent, if somewhat belated, biography of Charles Eliot, who died in the year 1897. It is consequently difficult for English readers to feel very interested in the account of his private life, which is set out in intimate detail, although one may appreciate his many personal virtues. The chief interest of the book to English readers relates to his professional career and technical writings and reports.

As a young man, Charles Eliot submitted himself to the patient and determined preparation for his work which is characteristic of his countrymen, but beyond the possibilities, and, we fear, beyond the inclinations, of many Englishmen. The account of his European travels and the list of places he visited in this country and on the Continent have a value of their own. His comments and criticisms of many parks and gardens suggest unusual judgment for so young a man.

In his day Eliot strove to open the eyes of a public more concerned with making money than with art. He saw how lamentably building and industrial development were despoiling his country of its natural beauty, and protested passionately against wanton waste of a great economic and artistic asset. His writings were for a public largely unsophisticated.

As a pioneer he had to deal with much that was elementary. Moreover, he died nearly thirty years ago. Consequently some of the principles which he laboured to set before his countrymen may appear simple truisms to people of the present day, who are better versed in garden and landscape art.

Taken as a whole, however, his opinions make interesting reading and are valuable matter for study. His earnestness and enthusiasm offer an inspiring example, and the early death of this talented man must have been a great loss to the famous firm of Olmstead in which he was a partner.

## NOTES AND ABSTRACTS.

**Cocksfoot Moth** (*Glyphipteryx fischeriella* Zell.), **On the Structure, Life-history, Economic Importance and Distribution of the.** By Roshan Lal Chopra (*Ann. App. Biol.*, xii No. 3, July 1925, pp. 359-397; 21 figs.).—A very complete account of the Cocksfoot moth and its economic importance in the cultivation of cocksfoot (*Dactylis glomerata*). The first part of the paper is devoted to notes on the family Glyphipterygidae; synonymy, characters and distribution of the genus *Glyphipteryx* Hüb.; detailed descriptions of the egg, larval, pupal, and adult stages and life-history.

The second half deals with the economic importance of the moth, control measures, and distribution within and without the British Isles.

Within Great Britain the distribution is fairly general, whilst records of its occurrence are reported from France, Germany, North Africa, and Asia Minor.

Seeds from various sources were sown in order to arrive at the degree of attack. Indigenous plants were more subject to attack than plants raised from American, Danish, and Swedish seed. The results are shown in a series of four diagrams.

It is thought that by reason of the protection afforded the larva within the glumes there is little chance of parasitism.

To ensure against infected seed, it is advised that all seed be subjected to hot-air (60° C.) for 24 hours; this will kill all larvæ within the seeds without impairing the germinating power.—G. F. W.

**Government Action respecting Fungicides and Insecticides; A Discussion on the General Principles that should underlie** (*Ann. App. Biol.*, vol. xii. No. 2, pp. 287-301).—An interesting discursive paper dealing with the varying views expressed by chemists, entomologists, mycologists and growers on the important question of the standardization of materials used in the preparation of fungicides and insecticides. The "Insecticides and Fungicides" Bill was drawn up in 1921 and temporarily shelved for reasons of national economy.—G. F. W.

**Grass on Trees, the Effect of.** By A. Howard (*Proc. Roy. Soc. B.* 97, pp. 284-321; 1925).—A notable addition to our knowledge of the root-systems of trees, which are shown to have, in the Indian soils dealt with, a superficial system and a deep soil system up to 14-20 ft. below the surface. Various fruit trees are shown to be as sensitive to the presence of grass over their roots as are fruit trees in England. The guava of all the kinds tested was less sensitive than others, but forest trees were found to hold their own. The guava proved extremely useful in the investigation, for while its superficial root-system was well developed yet it attained only half the size reached by similar trees in cultivated ground. Other fruit trees in the grass did not develop a practicable superficial root-system and suffered more. Measurements showed that at certain periods of the year the amount of carbon dioxide in the soil was much greater in the areas covered by grass than in the cultivated areas, and to this is attributed the failure of the superficial root-system to develop in the majority of the kinds of fruit trees grown (custard apple, plum, loquat, litchi, mango, guava, which suffered in the order named). The author considers that this failure of the trees to develop a superficial root-system in grass land accounts for part of the harmful effects of the grass, and his experiments with the guava strongly suggest that the rest of the trouble is to be accounted for by the poverty of the grass land in available nitrogen, for manuring with sulphate of ammonia redressed the difference and, in fact, caused the production of more vigorous growth, etc., than occurred in the corresponding trees in cultivated land. Aeration alone, while it improved matters somewhat, did not permit of good growth on the grassed areas. Both effective aeration and the supply of available nitrogen were required, and these were sufficient.—F. J. C.





The Late WILLIAM RICKATSON DYKES, M.A., L. ès L., V.M.H.,  
Secretary R.H.S. 1920-1925.

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# JOURNAL

OF THE

## ROYAL HORTICULTURAL SOCIETY.

VOL. LI. PART II. 1926.

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WILLIAM RICKATSON DYKES, M.A., L. ÈS L., V.M.H.,  
Secretary of the Royal Horticultural Society, 1920-1925.

THE loss which the Society has suffered in the death of its Secretary is fresh in the minds of all its Fellows, for the end came while he was in the prime of life and with terrible suddenness. Motoring on a road slippery with snow, his car skidded, collided with a lorry, and he was thrown out, suffering injuries of so severe a nature that it became necessary to amputate his right arm a few days afterwards, and death followed speedily upon the operation. To those who knew him best his death came as more than a shock, for they realized that it was only quite recently that he had obtained his heart's desire in the shape of a home with a garden where he could grow his beloved Irises and Tulips and the other plants which he was beginning to bring within the circle of his intimate acquaintance.

There, indeed, he had been busy on the day of his accident, and there with Mrs. DYKES he delighted to work. With his own hands he hybridized his Irises and Tulips, collected the seed, sowed it, pricked out the seedlings, and eventually transferred them to their flowering quarters. His garden was, in fact, largely the result of his own personal work and skill, and a pleasant place it was on the crown of a hill between Woking and Guildford and near to the village of Worplesdon.

DYKES was only forty-eight when he died. The second son of the late ALFRED DYKES, he was educated at the City of London School, Wadham College, Oxford, and at the Sorbonne, Paris. In 1903 he

became a master at Charterhouse, and he remained there until his appointment as Secretary of the Society in 1920.

On leaving Charterhouse, the late Professor BATESON most kindly allowed him to make a temporary home for his plants and bulbs at the John Innes Institution at Merton, but he was never quite happy there. He longed for a garden which he could call his own.

The great reputation which he made for himself as a student of Irises while he was at Charterhouse is referred to elsewhere, and indeed probably no one has used his garden to better purpose in the development of a monograph of a single genus than DYKES did in writing his great book. All through this time, and later when he became Secretary, he was always ready to talk Irises; always eager for the knowledge others had gained of them in their work or wanderings; always excited at the prospect of a new species of Iris; and, though his disappointments were many, his desire to grow seeds of Irises collected from every possible locality never failed, nor did his skill in their cultivation.

When he accepted the post of Secretary of the Society he essayed no easy task. His predecessor had been a veritable Napoleon in his management of the Society's business and affairs, and DYKES came to Vincent Square with no real knowledge of its history, with little experience of working with committees, and with only that knowledge of organizing that he had gained as a master in a public school. But he entered into the work with characteristic energy, and thenceforth devoted all his powers to it. He was a glutton for work, and he gradually adapted himself to his new surroundings, and tackled the problems which are always arising in a great Society such as ours with fearlessness and courage.

The greatest of the problems with which he had to deal was probably that of finding room for the ever-growing crowd of visitors to our fortnightly shows, and he lived long enough to see the foundations of a solution of that problem well and truly laid. It remains for others to see the superstructure rise and to feel the benefit of the work in the initiation of which he had so large a share. The arrangements connected with the building of a new and larger Hall and the provision of more adequate accommodation for the Society's business was the largest and most important work which fell to him, and the acquisition and continued publication of the *Botanical Magazine* was perhaps the next; but in every section of the Society's work he played his part. How multifarious this work is few outside the Council and the staff know.

With all his occupation in the Society's affairs and his interest in his plants he never lost a certain boyish delight in a merry tale, and it was perhaps to this youthfulness in him that his character owed its charm. Like a boy, too, he was almost impetuous in his desire to carry out some new scheme which he had evolved and which he thought would be beneficial to the Society; and, by adopting the blunt straightforwardness of the soldier, he has been known to fail to convince his hearers when he might have succeeded had he been prepared to use



the tact and skill of the diplomat. After all, this straightforwardness was one of the finest traits in a very attractive character, remarkable for its strength and its sincerity. His one idea in life was to promote the best interests of the Society, and in this he succeeded to an extent far greater than is generally appreciated.

It was delightful to watch his eagerness to acquire new varieties of his favourite plants, and there are many who found his enthusiasm for Irises very infectious; in fact, it is difficult to think or speak of DYKES except in connexion with Irises, and this must be the excuse for the repeated mention of them in this note.

Such enthusiasm as his is rare ; and it was combined with an infinite capacity for inquiry, energetic and dogged pursuit of his aims, and an honesty of purpose which made for him a great place in horticulture and makes his loss a severe one for us all.

C. T. M.

F. J. C.

## THE WORK OF W. R. DYKES ON IRISES.

By GEORGE YELD, M.A., V.M.H.

Two meetings stand out conspicuously in the story of my devotion to Irises: the one when I first met Sir MICHAEL FOSTER in his garden at Shelford, Cambridge, and the other when he introduced me to W. R. DYKES as "one of us."

When "Irises," by W. R. DYKES, was published (in 1911) in the Present Day Gardening Series, Professor I. BAYLEY BALFOUR wrote in the Preface:

"The gardening world has recognized for some time that in the realm of Iris the mantle of the late Sir MICHAEL FOSTER descended upon the author of this book—and it will confirm the succession."

The publication of that splendid monograph "The Genus Iris" fully proved the truth of the Professor's prophecy.

When Sir MICHAEL FOSTER took up the cultivation and, so to speak, the championship of the Iris, it was as though

"Far off a solitary trumpet blew,"

and to-day there are many challenging trumpets raised in praise of the Iris, not only in England but in France and the United States of America. The plant is gradually coming to the prominent position in gardens and in the love of gardeners which its beauty and its kindly character deserve, and this popularity it owes very largely to the efforts of W. R. DYKES. It will be my endeavour in this article to show the truth of this statement.

"Irises," in Present Day Gardening Series (no date on title page, but I think 1911 is right), was the first book to deal accurately with the various species of Iris and their cultivation. At the time of its appearance it was by far the most helpful work that could be obtained by anyone who wished to take up the cultivation of Irises, bearded or beardless. Moreover, it contained eight excellent coloured plates.

"The Genus Iris," a splendid and comprehensive monograph, was issued from the Cambridge University Press in 1913. Beautifully printed, and well supplied with excellent illustrations, it is, of course, the standard authority on the botany, the history, and the cultivation of Irises. It gathers together all that was known at the time about Irises, thanks to the work of Sir MICHAEL FOSTER, Dr. GILBERT BAKER and others, and adds the immense amount of knowledge acquired by the skilful, patient, and persistent investigations of DYKES himself. He followed the methods of FOSTER in raising from seed and growing the plants in his own garden whenever it was possible to do so, and thus combined the skilled knowledge of the botanist with the practical experience of the gardener. I remember once in conversation with Dr. GILBERT BAKER regretting the difficulty of finding time for com-

bining botany with plant-raising and hybridization. He consoled me by saying that the difficulty was a very real one, almost, if I remember his words correctly, an impossible one. Yet DYKES succeeded in combining them perfectly. He probably raised from seed more species than anyone else in the world, and only recently advised amateurs to take up the growing of natural species because he considered there was yet much to be discovered in the study of the genus.

I am not now concerned to review this great book, but merely to recall the importance of the work which DYKES accomplished in it, and the debt under which he placed all students of the Iris, whether botanists or practical gardeners.

In 1924 DYKES laid the Iris lover under a further obligation by publishing "A Handbook of Garden Irises." He says in his Preface: "Some apology is perhaps needed for the production of a third book on Irises. My excuse is that of the two former volumes the earlier and smaller has long been out of print, while the large monograph was written primarily from the botanical and not from the horticultural point of view. The present volume is intended for gardeners, though it is hoped that the information as to the distribution of the various species, the speculations as to their affinities, and the botanical details, which in certain cases must be understood in order to separate closely allied species, will prove no less welcome than the hints as to their cultivation, which are the results of an experience of some twenty years."

This book is a great success—in fact it forms a *vade-mecum* for all Iris growers; for beginners it is indispensable, and even cultivators who have devoted thirty or forty years to this delightful flower may learn much from its pages. If DYKES had done nothing more than produce this triad of excellent volumes he would have earned the warm gratitude of all Iris gardeners, but he has done much more than this. His writings from time to time in the JOURNAL of the Royal Horticultural Society, in the Horticultural papers, in "Les Iris Cultivés," in the Journals of the Iris Society and of the American Iris Society, have added to our knowledge of and sustained our interest in the plants he loved.

DYKES took a leading part in the formation of the Iris Society, which was followed by the collection of a garden of Irises at Wisley (already numbering over 800 varieties) and which, when I last saw it in 1925, promised to be a very great help to growers in future years. It is managed by a joint committee of the Royal Horticultural Society and the Iris Society and is presided over by Sir WILLIAM LAWRENCE.

This article would not be complete were I not to enumerate some of the new Irises with which DYKES has delighted us: such beautiful things as—to name only a few—Aphrodite, perhaps the best pink, Amber, a very fine yellow, Harmony \* (syn. Thundercloud), among bearded Irises—and many hybrids among beardless varieties, one of which, Turkoman, obtained the exceptional distinction of a F.C.C.

\* Shown by the Orpington Nurseries.

It is pleasant to remember that last year DYKES flowered in his own garden a plant which is likely eventually to delight Iris lovers for many years—a glorious yellow bearded Iris as tall and as large as Alcazar.\*

I have added as an appendix a list of the articles on Iris contributed to this JOURNAL by DYKES, as well as an enumeration of the plants for which (from 1910 to 1924) he received the F.C.C. or A.M. from the Floral Committee, for which I have to thank Mr. CHITTENDEN.

1. List of articles by DYKES in R.H.S. JOURNAL :

“Some Garden Irises,” vol. 40, pt. 2, December 1914, pp. 226-233.

“The Classification of Garden Irises.” Introduction by W. R.

DYKES, vol. 47, pt. 1, January 1922, pp. 2-5.

2. Irises raised by DYKES and certificated :

AMBER, A.M. June 11, 1924.

BUCHARICA AUREA, A.M. March 23, 1920.

DOUGLASIANA MERTON, A.M. May 8, 1923.

FULVALA, A.M. June 21, 1910.

GOLD CREST, A.M. May 19, 1914.

IOTA, A.M. June 3, 1914.

TENAX PURPUREA, A.M. May 8, 1923.

TURKOMAN, A.M. May 20, 1919.

„ F.C.C. May 13, 1924.

UNGUICULARIS PEACOCK, A.M. March 25, 1924.

\* Since named after him. (ED.)

## THE NEW HALL.

By J. MURRAY EASTON, A.R.I.B.A.

[Read April 7, 1926; Mr. C. T. MUSGRAVE in the Chair.]

THE Chairman, after formally introducing the lecturer, said: Before I ask Mr. EASTON to explain the plans to you in detail I think it may be of interest to you to hear a short account of the steps which the Council has taken in the past and which have led up to the position in which we find ourselves to-day. For some time prior to 1924 the Council had been fully aware that the present hall was not adequate for the needs of the Society, either from the point of view of the exhibitors, to whom the Council could not grant sufficient space for their groups, or from the point of view of the Fellows, who were prevented by the crowded state of the hall from examining the exhibits in comfort.

A Committee was therefore appointed to consider the whole question, and to inquire into the possibility of the enlargement of the present hall, or of acquiring a site for another hall. On going into the matter, the Committee came to the conclusion that there was no means of enlarging the hall, as the land immediately adjoining was not available. Many suggestions and sites were considered, and there is no doubt that it would have been possible to obtain a larger site had the Council been prepared to advise the Fellows to move the Society's home to some such district as West Kensington or Hampstead. It was, however, thought that the great majority of the Fellows of the Society would consider it far more satisfactory and convenient if a site could be obtained as nearly adjacent as possible to our present hall, where we are, so to say, in the centre of London, near to main line stations and the Underground, and only a short distance from one of the main arteries of London from the City to the West End with its omnibus service.

The result was that the Council decided on a site just at the back, or east end, of this hall, fronting Greycoat Street and Elverton Street, where, as you were told in the Book of Arrangements for this year, there is room to erect an Exhibition Hall almost twice as big as our present hall. So far I have been speaking as Chairman of the Housing Committee, but here I should like to say a few words giving my own personal views as a Fellow of the Society. It seems to me that a hall twice the size of our present hall is amply large enough for our requirements. We do not want a Chelsea Show once a fortnight, even if we could get it, and I doubt if our friends in the trade would be prepared to send up once a fortnight much larger exhibits than those we see at the present time. My own idea is that it is not so much to increase the number and size of the exhibits that we require a larger hall as to increase the room or space for Fellows and visitors to see the exhibits

comfortably and conveniently. One of the attractions of our present fortnightly shows is that all the exhibits can be seen and appreciated in an hour when there is not too big a crowd in the hall. This would not be the case if the number of the exhibits was largely increased.

But now to return to my story.

By a resolution passed at the Annual General Meeting of the Society on the 12th of February, 1924, the decision of the Council was approved and it was authorized to acquire the site and erect a hall.

After much serious consideration as to the amount of accommodation which it was necessary to provide, the Council asked several architects of repute to submit plans, and its choice fell upon the design of Messrs. EASTON & ROBERTSON. A happier choice could hardly have been made. In addition to domestic and ordinary work in London and the country, the partners in this firm, Mr. EASTON and Mr. ROBERTSON, have made a particular study of big buildings, such as public halls, galleries and museums, with special reference to lighting and acoustical properties. For that purpose they have visited every country in Europe, other than Russia and what used to be called the Balkan States. They designed and carried out the British Pavilion and Restaurant at the Paris Exhibition of last year, which received the "Hors Concours," the highest award, from the French Government. Some of you may have seen the building, and if you thought it somewhat unusual, you must remember that it was a special requirement that the plans should not be based on any historical style, but should be of a completely novel and fresh character. They have also carried out a big scheme at Prestatyn, in North Wales, including a concert hall, a pavilion for dancing, and a big hotel, and they have just completed drawings for another hall in London.

These two gentlemen have combined with their great skill and ability a desire to meet, in every way and without a moment's hesitation, the wishes of the Council and of the Housing Committee. There is one word which does not exist in the mind or vocabulary of either of them, and that is the word "impossible." Our schemes and ideas have never been impossible. If they could not give us exactly what we wanted they could always provide something very near it. In fact, I may say that we may congratulate ourselves thoroughly on having secured their services.

I will now ask Mr. EASTON to describe the proposed new hall.

Mr. EASTON: The new hall of the Society to which we belong exists so far only on paper and in imagination, and it is not an easy matter to convey by word or even by drawings a life-like conception of it as a solid structure of bricks and mortar—or perhaps I should say in these days, of steel and concrete.

Now, however, all the main requirements have been decided upon by the Council and Housing Committee, and incorporated in the design, and the time is ripe for an account of it that will have to pass muster till the new hall can tell its own story. I am afraid this description is

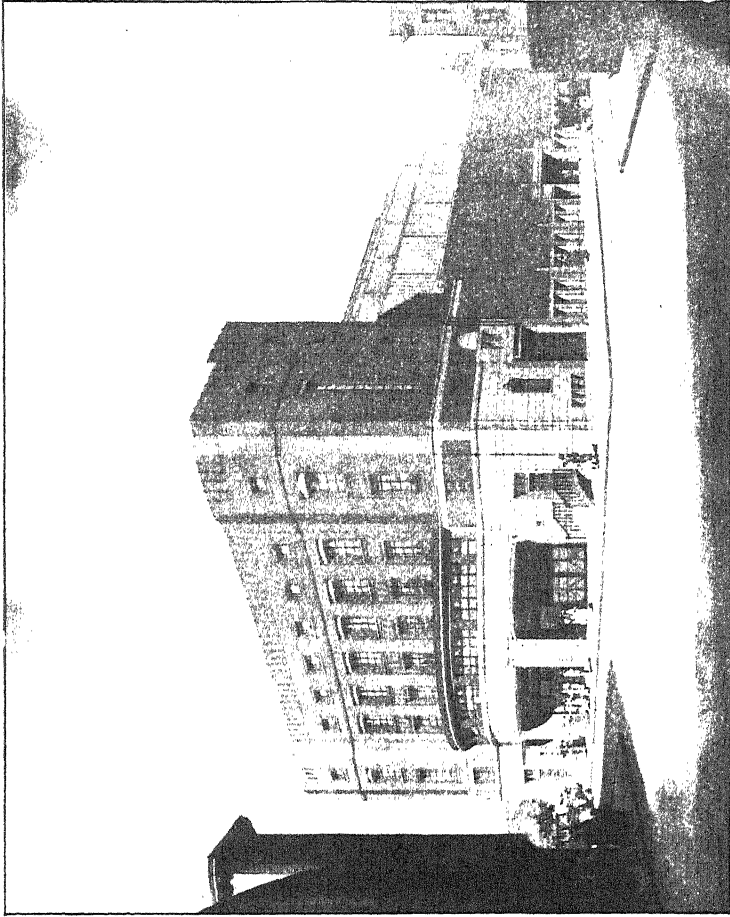
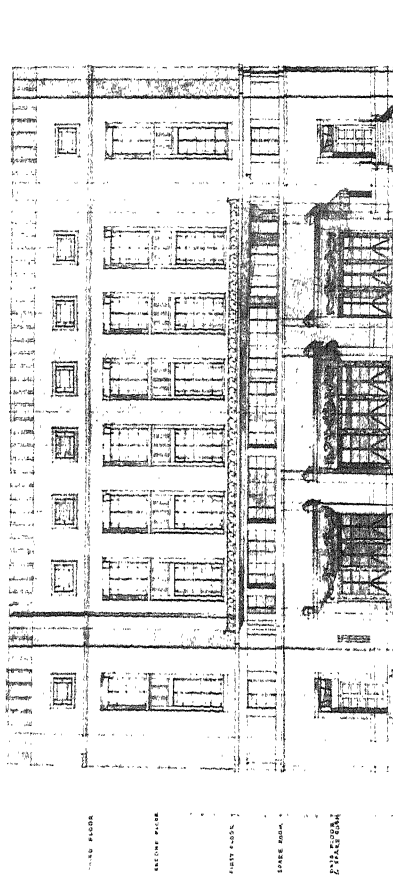


FIG. 41.—THE SOCIETY'S PROPOSED NEW HALL,  
ELVERTON STREET, WESTMINSTER.

SCHEME F  
AMENDMENT

ROYAL HORTICULTURAL HALL  
WESTMINSTER

DRAWING NO. 5  
REVISED EDITION  
MAY 11 1922



ELEVATION TO GREYCOAT STREET

SCALE OF 1 INCH = 10 FEET

EASTON & COBBERTON  
ARCHITECTS  
36 BEDFORD SQ  
W.C.

FIG. 42.—THE PROPOSED NEW HALL. THE GREYCOAT STREET ELEVATION.



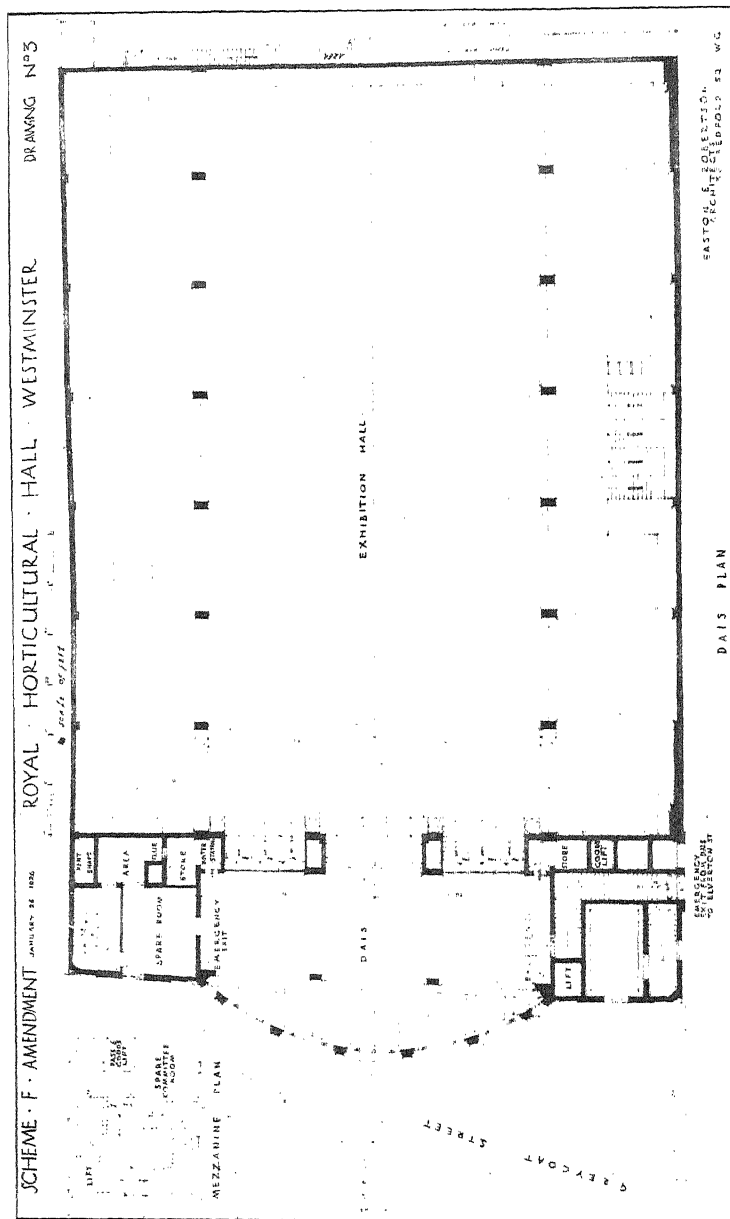


FIG. 43.—THE PROPOSED NEW HALL. PLAN SHOWING EXHIBITION SPACE.

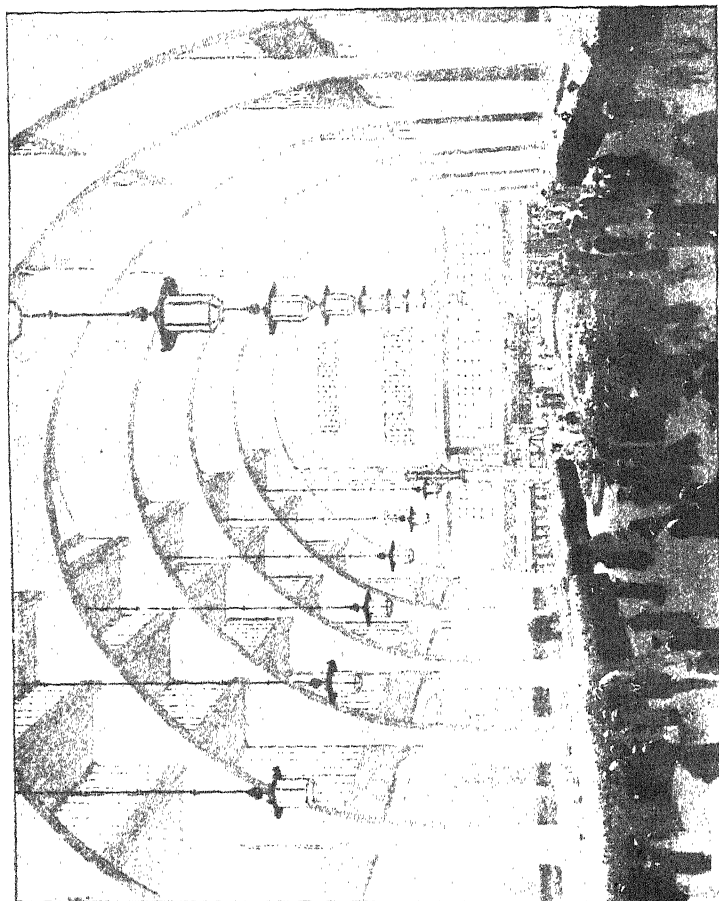


FIG. 44.—THE PROPOSED NEW HALL. INTERIOR OF EXHIBITION HALL.

*To face p. 185.*

bound to be a little one-sided, since it is written from the point of view of the architect and designer. Details I consider interesting you may not, and for any such I make apology in advance.

The design of a large hall with its accompaniments is one of the most stimulating problems that an architect can have to deal with. Architecture is pre-eminently the art of enclosing and arranging spaces so that they satisfy every kind of human need and aspiration. When, as in the present instance, the space is very large and there are special requirements of lighting and of ingress and egress, both of people and exhibits, the problem is as interesting as it is complex.

The site, exclusive of a 10-foot passage on the east side required by the L.C.C., and of a small triangle at the west end, of which building economy and good appearance prevent the use, has an area of some 24,146 sq. feet, and the actual exhibition space in hall proper and dais amounts to some 20,880 sq. feet. The level of the hall itself is 5 feet above the pavement, an arrangement arising from the desirability of getting a well-lit basement for restaurant, kitchens, etc., and from the fact that the level of the sewer is such that the lavatory accommodation has to be provided not more than 4 feet 6 inches below the ground surface. Facilities for quick and easy loading are provided for (over and above the eleven ordinary entrances and exits) by a large goods lift, which will raise exhibits from the pavement to the hall level, and by a sloping way at the east end which will enable the bulk of the deliveries to be handled by trolleys. In view of the size of the hall, it may be pointed out that, even if it were possible to unload at all points directly from the street, the distances which exhibits would have to be carried inside the hall would still make trolleys desirable, and the fewer openings there are in the walls the greater the exhibition space available. I may say that this question of loading and unloading received a great deal of attention, and that all possible arrangements were considered. My partner and I examined the loading facilities in the existing hall and consulted several exhibitors and also an expert on the subject, who advises manufacturing and distributing firms on their loading problems.

The next problem, or perhaps the first problem, presented by the site was the question of where the main entrance and the committee rooms should be placed. A certain minimum depth was necessary for these apartments, and it seemed in every way better to take this space off the short or Greycoat Street side rather than off the longer one facing Elverton Street. The latter gave more space than was required on the ground floor, and consequently would have provided a hall with one or two annexes, which could not have top light. Further, the L.C.C. regulations made it impossible to build higher than 40 feet, except in Greycoat Street. Thus the general form of the building was determined, and I should like to say here that it has been our aim to approach each problem without any preconceived ideas of what we wanted to do and to find a solution only after the whole of the data had been considered.

The next question that arose was the method by which the hall should be lit, and here my partner and I had the benefit of a survey of nearly all the most recent exhibition halls of Europe, and of many in the United States. I had seen, at the Gothenburg Exhibition of 1923, a system of lighting by tiers of vertical windows which appeared to me to give better results than any other I had ever seen. Such a method was not absolutely original, but it was there, I believe, first worked out to its logical conclusion. Since then it has been eagerly accepted by the ever-alert Germans, and also by the French. The Wireless Industries Exhibition Hall, recently completed in Berlin, the Concert and Conference Hall at Breslau, and the Cattle Market at Lyons, are quite recent examples of this method. One or two buildings in the Paris Exhibition of last year were also so lit, and new baths in Paris show its use in a greatly reduced form, but make sufficiently clear the value of even a small amount of well-placed vertical lighting. As in so many cases, it was first tried in this country, in a restricted form, for, as you doubtless know, many of the offices of the Bank of England were so lit. Sir JOHN SOANE, the architect of the Bank, was a forerunner of those present-day architects who believe that the functional efficiency of a building is the first thing to be considered. The alternative method of lighting a large building of this kind is by means of a roof either partly or completely glazed, as in the present hall. Its disadvantages lie in a tendency to leakage, which is always found in roofs of this character, the difficulty of keeping it clean, and the impossibility of regulating the light which enters. A relatively flat glazed surface receives the full force of the sunlight, and if not obscured in some way would produce intolerable heat and glare in the summer—when we get any summer! If we get an exceptionally dull day in summer we have to put up with a shading on the roof which is there to cope with a bright day, and in any event the light is lacking in cheerful quality, especially in London, where soot so quickly settles on all horizontal surfaces. In the system of lighting by tiers of vertical windows here adopted, there will be clear glass which can very readily be cleaned from outside; on the south side, where sunshine might occasionally prove trying, blinds will be arranged so that in a few minutes the hall can be suitably protected. The horizontal surfaces are solid roofs of concrete, which will greatly diminish the liability to changes of temperature that arise from glass roofs. It was not without some diffidence that we put forward to the Society a scheme of lighting which had not previously been seen in this country, but we took advice from a scientific investigator on light, and the Housing Committee also had practical tests made on the model of the hall by the National Physical Laboratory. The conclusions reached were thoroughly satisfactory, and we have no doubt whatever of the result. A certain amount of light in the hall is, however, derived from sloping glass roofs. This is due primarily to the necessity of avoiding the risk of loss of light from the possible future heightening of the premises to the north of our site. Partly owing to the last requirement and partly owing to the very large span, it was decided to divide the hall into what might

be called a nave and aisles. The roofing of the whole hall, which is 120 feet wide, in one span, would have been quite possible but would have entailed fairly large piers projecting into the hall along the outside walls, and it was considered no more objectionable from the point of view of practical convenience that the main truss piers should stand actually in the hall, while from the point of view of appearance the effect will be infinitely more attractive. The side portions are about 24 feet high and about 24 feet wide, and as they are quite as well lit as the centre part they will be in no sense cut off, and I am certain that the show space round the outer walls will be as eagerly sought for as it is at present. The dais portion over the entrance hall contains some 2,000 sq. feet, and is meant to serve a variety of purposes. There is both high side light and top light over the segmental portion of it, and this will provide a considerable well-lit area for exhibits. The part nearer the main hall, which will not be quite so brightly lit, will be very useful as a sort of lounge in which people can overlook the main show, thus relieving congestion on the floor. It will be raised above the main floor about 6 feet and approached by a wide flight of steps, over which, when required, a platform can be erected. Artificial lighting will be ample, and, in order to correct the distortion of colour that takes place under ordinary electric lighting, colour screens will be made use of so as to produce an effect very close to daylight. This will be particularly valuable in foggy or dark weather.

The problem of making the hall suitable for other purposes than those of the Society has also been considered, and the hall will be made as acoustically satisfactory as its nature permits. Over the movable platform already referred to will be placed a projecting surface to act as a sounding-board, and folding doors will enclose the back of the platform to reflect the sound waves forward. The east wall will be treated with sound-absorbing material to prevent echo, and while the shape of a first-class concert hall is incompatible with the requirements of first-class lighting, we are trying to ensure that music and speaking will be clearly heard everywhere.

The requirements of public safety very properly insisted upon by the L.C.C. necessitate numerous entrances and exits both for emergency and ordinary purposes. Eleven 5-foot doors lead from the hall, either directly into the open air or into the entrance hall, while an additional direct exit is provided from the dais. To provide the required number of exits for a seated audience over the whole hall would have involved considerable further loss of space; but it is probable that by an arrangement of screens shutting off the side aisles a licence may be obtained for a fully seated central part. A system of ventilation has been designed to meet the requirements of the L.C.C., and will consist of a supply of warmed and cleaned air pumped into the building at the rate of about one million feet an hour. The openings through which it enters will be kept large so as to avoid any suspicion of draught, and the vitiated air will find its way out naturally by means of openings in the upper part. Some additional heating will be provided by means of hot-water pipes to prevent any risk of down draughts from the

colder glazed surfaces. Other comforts and conveniences will include extensive cloakrooms and lavatories in the basement and a large restaurant with a buffet. In connexion with the latter there will be kitchens designed on the most up-to-date lines, capable not only of providing for the restaurant but of dealing with banquets which may from time to time be held in the hall itself. The arrangement of suitable lifts and communication between these kitchens and the hall in such a way as not to lose space or spoil the appearance of the latter has been one of the most difficult parts of our task. A system has now been evolved which satisfies the most experienced and exacting of caterers. The rest of the basement is occupied by equally necessary but less conspicuous quarters, such as the heating and ventilating chambers and storage space, while the upper rooms of the Greycoat Street block are laid out as committee rooms. These are in three tiers, and there are three in each storey, some with supplementary accommodation. The lowest storey is so arranged that the rooms can be thrown into one hall provided with an emergency exit and a space in which a cinema apparatus can be installed if required. The rooms of the topmost storey are lit in studio fashion by north lights running across each room, which will give the ample and uniform lighting required by floral and other committees. All those rooms will be served by two lifts, one from the entrance hall for passengers and another from the exhibition hall for specimens as well as passengers. Accommodation has also been provided in the north-west corner for a caretaker, who will have ready access to the roofs and to all parts of the building.

I have not hitherto referred to the exterior of the building. In designing it, my partner and I have aimed at expressing as simply and clearly as possible the character and function of the hall, and at making the appearance worthy of the Society's headquarters, but with a full regard for economy. The pictures explain it much more fully than words. The walls generally will be faced with brick above a Portland stone base. The framework of the building will be of reinforced concrete, and in the design of this we have had as consultant Dr. OSCAR FABER, whose skill and experience will be a guarantee of soundness. Within the hall this framework will be left without any disguise; indeed, the whole effect of the hall will depend on the direct expression of its structure and materials. In the normal way, work will commence early in summer and, all going well, the building should be completed in the late autumn of the following year. The securing of a satisfactorily designed building springs from a clear understanding between architect and client. To state the problem is half the battle won, and in this we have enjoyed unusual assistance from the Housing Committee and its Chairman. The members have taken infinite trouble to decide what is really required and to settle these requirements at the right stage, and we hope that when the contract has been settled the building will go forward quickly and that none of the delays and expenses that arise from alterations will occur.

## TAXACEAE AT ALDENHAM AND KEW.\*

By the Hon. VICARY GIBBS, V.M.H.

SEVEN genera, hardy in the British Isles, are, or rather were till recently, included among the Taxads: the well-known Yew, the equally well-known and even more interesting Ginkgo, now separated, and five small and comparatively unimportant relations, *Cephalotaxus*, *Podocarpus*, *Prumnopitys*, *Saxegothaea*, and *Torreya*, which are hardly known here except by those for whom trees have special interest. All these are evergreen except the Ginkgo. Besides these, and next to them in hardiness, is the genus *Phyllocladus*, of which but one species, *P. rhomboidalis*, can claim to be anything but tender, and even this can only be grown with success in a warm climate like that of south-west England.

The English Yew, *Taxus baccata*, is a very old type, and is to be found in fossil state on the bed of the Bristol Channel and on sea-submerged land off the coast of Norfolk, under the peat in the Thames Valley, in Scotland, Ireland, Germany, and other places. One of the three conifers indigenous to the British Isles (the other two being the common Juniper and the Scots Pine), its habitat is not so widely extended as might be imagined, and though it is to be found all over Europe it flourishes mainly in the temperate north. Although most people regard it as conspicuously hardy, it will not stand extreme cold, and cannot, for instance, be cultivated in the Eastern States of America north of Philadelphia or thereabouts. In Massachusetts, where the Arnold Arboretum is situated, they have to content themselves with the Canadian and Japanese forms, viz., *T. canadensis* and *T. cuspidata*. Mr. WILLIAM ROBINSON in "The Wild Garden" remarks that "hard winters make no difference" to the common Yew, but ours were badly burnt by the cruel cold of January, 1895, when 3° below zero was registered at Aldenham, and there are records of their being killed in France in 1709 and 1789. Neither can it tolerate a great deal of heat, and I remember seeing it in the Botanical Gardens at Palermo, in Sicily, just existing, but certainly not flourishing, and this must be regarded as its southern limit. VIRGIL in the *Georgics* sings of "*amantes frigora taxi*," as if in his day Yews found some parts of Italy too hot for them. So far as soil is concerned the Yew is far more accommodating than with climate. Its natural soil is, I take it, calcareous, but here, where there is solid clay and no trace of chalk, it thrives excellently, and, indeed, I know of no decent ground in which it declines to grow. There is only one thing which it cannot put up with, and that is standing water at its roots, and in a heavy soil like that of Aldenham I have

\* Part of this article, now largely rewritten, first appeared in the autumn of 1920 in *Irish Gardening*, a magazine now unhappily extinct.—V. G.

found it liable to be killed by this cause after it had been planted for ten or even twenty years; for instance, owing to the drain-pipes having become blocked by elm roots we very nearly lost a fine yew hedge round the rose garden from this cause. This hedge was designed by myself just about 45 years ago, when the rose garden was laid out, and the "knot," or plan of the beds, was made by my father. I have lived to see the hedge completely developed, just as I saw it long ago in my mind's eye, and have even had the satisfaction of hearing admiring visitors attribute to it an ancestral age, one expert making it 300 years old! (fig. 45). I have found from experience that if one can afford the extra labour it pays very well in planting Yews on heavy clay, such as ours, not to dig any hole at all, but merely to break up the surface and set the Yews on the top of the ground, staking them for support, and bringing the lightest available soil to cover the roots.

*Rate of Growth.*—Bearing on the rate of growth in Yews, which is popularly supposed to be very slow, Sir ROBERT CHRISTISON, no mean authority concerning trees, estimated, when writing in 1879, the growth of a healthy Yew during the first 60 to 100 years of its life at the rate of 1 inch in girth every 12 years, during its second century 1 inch every 15 years, and during the next three centuries not more than 1 inch in 25 years. In one case in which he examined a tree of known age, he reckoned that after reaching the respectable age of 220 it had stood practically still, adding only 1 inch in the next 112 years. I cannot believe that there is anything unusual in such a stationary condition where really old trees are concerned. (See "Transactions of the Botanical Society, Edinburgh," vol. xiii.)

*Avenue Planting.*—The Yew is not a common avenue tree, but if pruned to a single stem, and with any overcrowded branches removed and all boughs up to a height of 6 to 8 feet cleared away so as to expose the reddish trunk, an avenue of Yews makes a very stately and impressive show. The first avenue of this kind which I ever noticed was in a wood in Somerset, at a place called Tyntesfield, belonging to my cousin, G. A. GIBBS, M.P., where it formed the approach to a cenotaph; though the trees were certainly not more than 80 years old they already produced a most noble effect. I imitated by planting an avenue here in 1897, to commemorate Queen Victoria's Diamond Jubilee, of which the two outer rows were of yew and the two inner of silver birch; it is generally admired at every season of the year (fig. 46). It was on this avenue that I was led to make an experiment with nitrate of soda which resulted most satisfactorily, having read in a French pamphlet that it acted as a marvellous stimulant to certain trees, and notably Yews. The plan recommended was to apply one handful of the chemical, mixed with fine soil to ensure good distribution over the roots, in March, and the same amount in April and May. It is important not to touch the foliage as nitrate burns it, neither should the chemical come within a foot of the stem. I found the effect to be that the trunks of all the trees were made to swell so rapidly that they flung off great flakes of bark, just as planes do, and they became quite soft and spongy, yielding



to the pressure of one's thumb as if they were made of india-rubber ; oddly enough, though nitrate of soda is so effective in promoting the growth of yews, wheat, and many other things, yet there are genera, such as the *Ailanthus*, on which it produces no visible effect. Fine Yew avenues are also to be found at Penrhyn Castle, and in Ireland at Dunganstown, Glasnevin, Mt. Wilson (King's Co.), and other places.

*Use in Churchyards.*—Everyone can recall some churchyard where a dignified old Yew makes a perfect contrast with the grey stone and "grassy barrows" that form its setting, and it has been alleged that the frequent occurrence of this tree in such spots is not so much due to any æsthetic feeling as to the fact that it was sacred in Druidical times, and that the earliest Christians used to build their churches on the sites that had been dedicated to an older Faith. Against this theory it may be urged that no traces of Druidical stones or altars are to be found in any of our church precincts ; but, whatever its truth, there can be no doubt that the planting of Yews in churchyards is a very ancient practice, for GIRALDUS CAMBRENSIS, visiting Ireland in 1184, records that they were frequent in ancient cemeteries. In Latin classical literature too the Yew is found connected with the idea of death. Readers ought to be grateful to me for not also quoting the too well-known quatrain from Tennyson's "In Memoriam" about the Yew's behaviour in churchyards, which, so far as I can see, every writer on Yews has fired off since its publication.

*Wood for Bows.*—It is not only with our religion that the Yew has been associated ; its boughs were at one time as essential to us in fighting on land as the oak to our welfare on sea ; nevertheless it is, I am convinced, a delusion to suppose that our bowmen at Crécy and Agincourt were armed with bows of English Yew ; our trees do not, and, I believe, never did, furnish *good* bows, and any learned toxophilite would confirm what I say. Even in the fourteenth century our bows were imported from the Pyrenees, and it was with Spanish Yew that we got the better of our gallant allies of a later date, the French, in the peculiarly unjustifiable invasion so successfully conducted by King Harry, the fifth of that name. In proof of the above possibly rather startling assertions I may quote DRAYTON's fine poem on the battle of Agincourt, where the English archers are described as "armed with *Spanish* yew so strong," and I may refer to numerous royal edicts ordering that foreign yew staves must accompany other imports. It may also be noted that an Act of Queen Elizabeth fixing the price of bows gives 6s. 8d. for "outlandish yew of the best sort," 3s. 4d. for "bows meet for men's shooting," and only 2s. for those "of a coarser sort," being English Yew.

*Poisonous Nature.*—It is common knowledge that Yews make the best of hedges, being more patient of the knife than any other conifer, and, provided that garden lads can be persuaded to abstain from dealing death to valuable beasts by throwing the clippings into the adjacent fields, there is nothing to be said against them for this purpose. With regard to the toxic alkaloid contained in the seeds and leaves of the Yew,

the cases where cattle have died from partaking of them are too numerous and well attested for there to be any doubt on the subject ; nevertheless it frequently happens that horses and cows continue to graze in fields where there is unrestricted access to growing Yews without injury. It is generally considered that the virulence of the poison is much greater in half-dried clippings than in the fresh leaves growing on the tree. There can, however, be no scientific basis for the belief that the withering of the leaves, or their fermentation by heating when piled in a heap, can possibly increase their poison content, though it might conceivably make the poison more effective. The truth seems to be that when cattle are habitually in a field where Yews are growing they do not, if there be plenty of pasture, eat enough of the leaves to get a mortal dose, but it is different should snow render their ordinary fare unobtainable, or should they be suddenly turned out from sheds on to grass so that the Yews have for them the attraction of novelty. Pheasants are fond of roosting in the branches, and a too hearty breakfast on the seeds has been known to prove fatal to them. Dr. JOHN LOWE, in his admirable work, "The Yew Trees of Gt. Britain and Ireland" (pub. 1897), mentions an edict by the Emperor Claudius advertising the merits of the Yew as an antidote to viper bites ; considering that the poison of all snakes is acid, and that of the Yew alkaline, the imperial prescription is not so unreasonable as some might be disposed to think.

*Duration of Life.*—The question of the length of the Yew's life has often been discussed, and a duration has sometimes been attributed surpassing the 969 years which the book of Genesis allots to Methuselah ; nor can such an estimate with regard to the tree, though open to grave suspicion, be *proved* to be wrong, however much it may be discredited by able writers like Dr. JOHN LOWE above mentioned. One constantly hears of a living Yew being mentioned in Domesday Book, the general survey of England begun in 1080 and ended in 1086. Now a quite young Yew would hardly have been worthy of record, so if a tree thus mentioned were really alive to-day it would be fair to assume that it has already equalled or surpassed the patriarch's record. But who can prove that such a tree is in existence, and that it is not merely a seedling grown up within a yard or two of the original parent, or even a younger plant which has grown round and swallowed the elder, on which we are looking ? The records are few and not over trustworthy, and tradition by itself is worthless, so it behoves no wise man to dogmatize ; the ordinary, and, in youngish trees, effective test—I mean the counting of the annual rings formed in the stem—is not available, for, given a Yew 969 years old, a bookmaker might very confidently lay the unusually liberal odds of 968 to 1 that the trunk would be found hollow inside, even if the external, uninjured bark were to suggest soundness. In the precincts of Fountains Abbey in Yorkshire, some decrepit old Yews were quite recently still alive which are alleged in the Guide Book to have served as shelter for the Monks when the Abbey was built some 800 years ago. If this tale be true

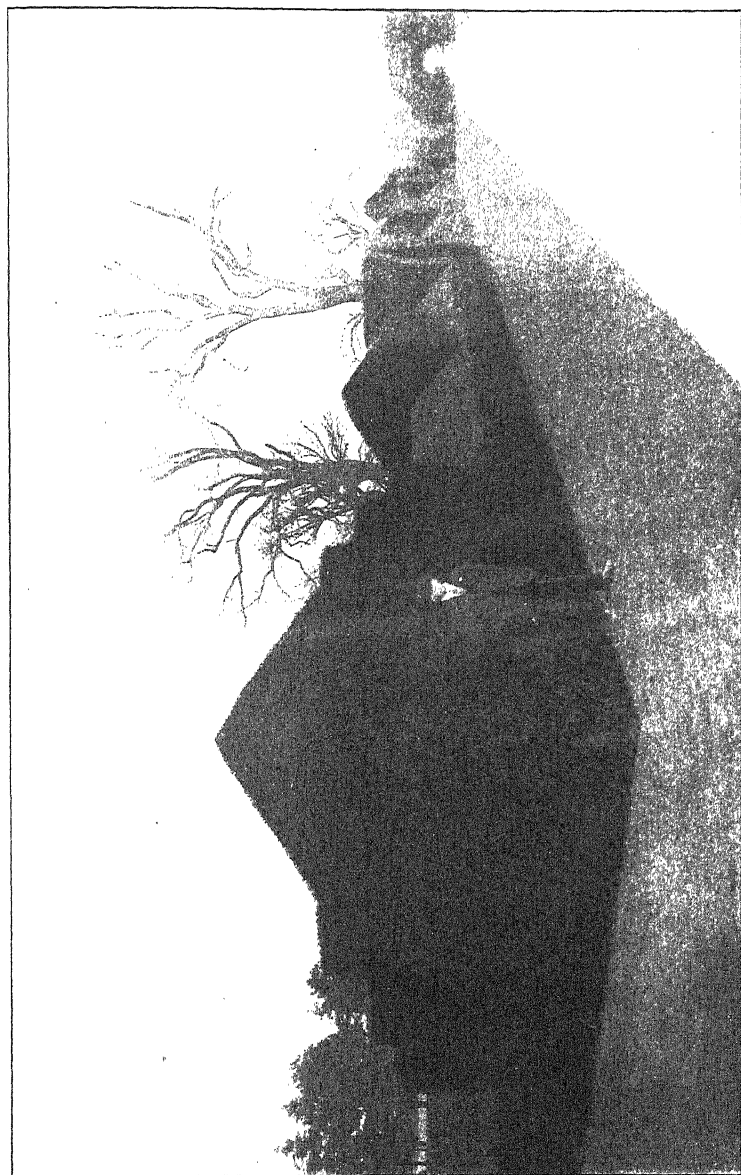


FIG. 45.—YEW HEDGE BY ROSE GARDEN, ALDENHAM.

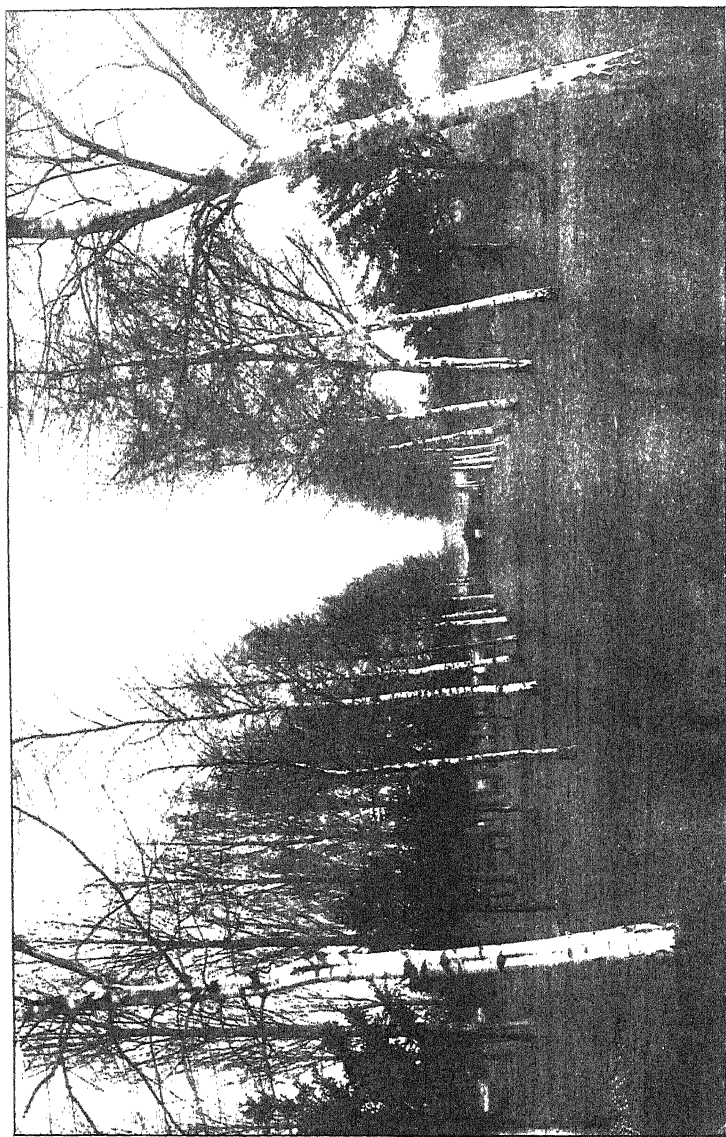


FIG. 46.—YEW AND BIRCH AVENUE AT ALDENHAM.

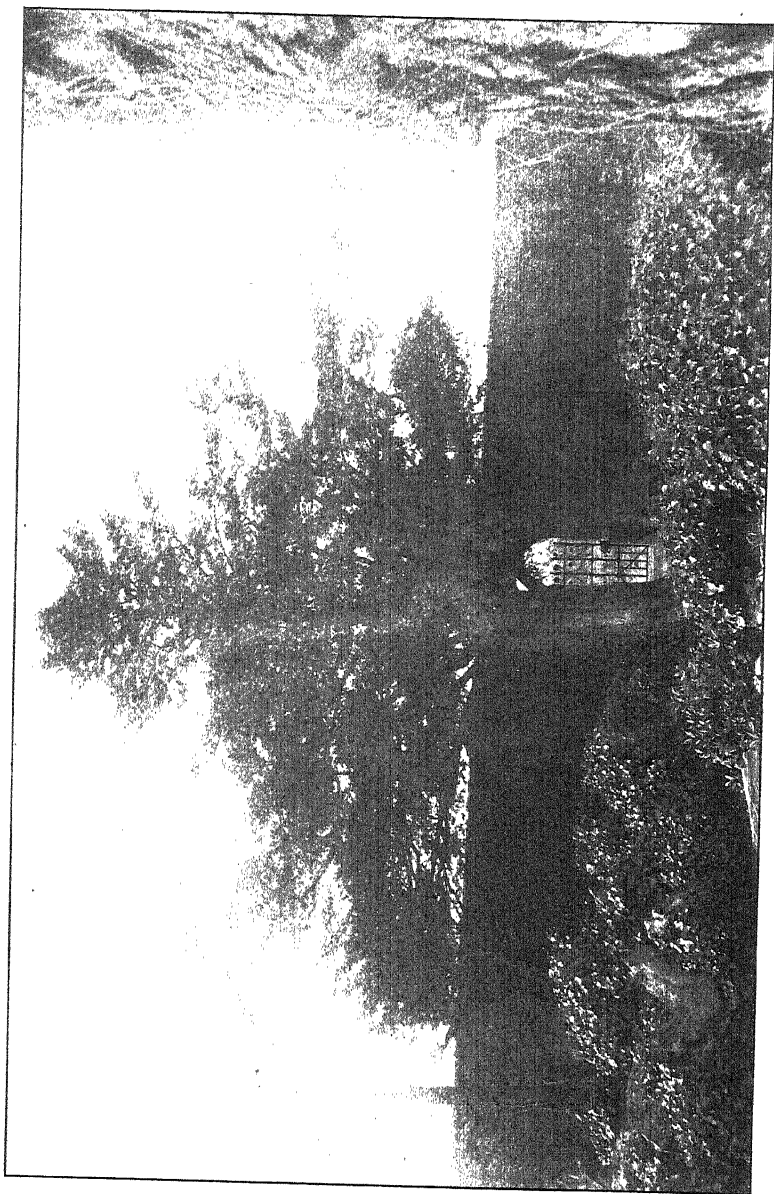


FIG. 47.—THE OLD YEW AT ALDENHAM.

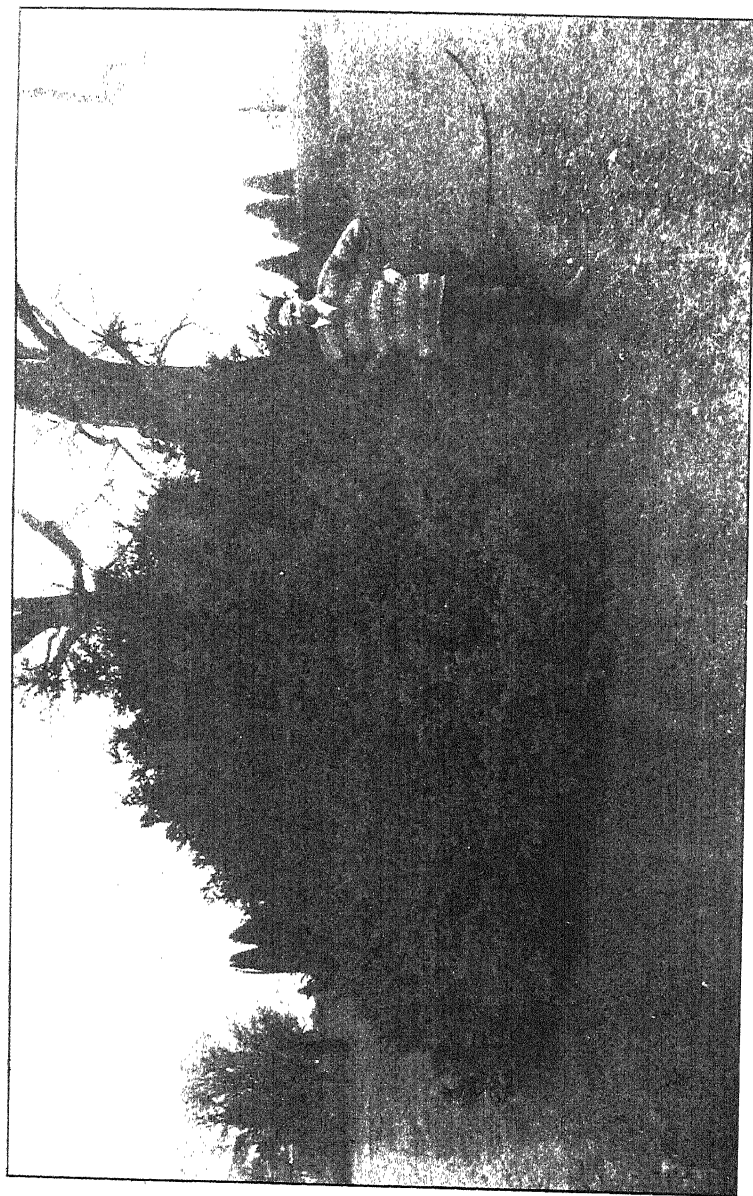


FIG. 48.—*TAXUS BACCATA AUREA*.

[To face p. 193.]

(an important proviso !) then these trees must needs be close on a thousand years old. After all, if we could believe that, the well-known saying about our English Oak that it is three hundred years growing, three hundred stationary, and three hundred dying, does not cover any gross extravagance of estimate; for my part I do not see why the Yew should not be the longer lived of the two. Again, the exceptional durability of Yew timber would make it likely that this tree should also be exceptional in its length of life; nevertheless I think that my verdict on its longevity must be that it is usually grossly exaggerated, as indeed one would expect. I feel sure, too, that tradition on the subject, as in the case of family history, genealogy, and such like, is absolutely worthless. For instance, Sir ROBERT CHRISTISON, above mentioned, stated that investigation made the age of the well-known Ankerwyke Yew to be 564 years in 1879, instead of above 1,000, though he considered that "so great a tree cannot be nearly so young."

*Topiary Work.*—The same patience of the knife referred to above has led to the use of the Yew in topiary work, but personally I am bound to say that shrubs formed in the shape of birds and beasts or teapots do not appeal to me, and unless in a purely formal garden they amount, in my eyes, to an actual disfigurement. In fact, I cordially echo the dictum of the famous FRANCIS BACON—"I for my part do not like images cut out in juniper and other garden stuff; they are for children." I am thinking of a picturesque rock garden, belonging to a friend, into which doubtful taste has allowed the inclusion of a large dog in Box. But there was much more excuse for Box and Yew being fantastically cut and carved in BACON's time, when the choice of tree-forms was strictly limited, than now in the twentieth century, when the whole world has been ransacked to provide our gardens with plant life in every conceivable shape that fancy can suggest, prostrate, globose, contorted, fastigate, or pendulous, all naturally produced, and untouched by the knife. Topiary art seems to have been at its best *temp.* WILLIAM and MARY, and Levens in Westmorland still happily remains to show us how good the work of that date can be. Indeed, perhaps the only garden that is comparable in its topiary work is the fine one of Packwood House, Co. Warwick, which was well illustrated and described in *Country Life* for August 1924. In this connexion I must not omit to mention Elvaston Castle, Co. Derby, where the fine modern topiary work is on a very large scale; and the fact that extravagant and over fanciful forms have been avoided, and the work mainly confined to obelisks, cones, pyramids, and such like, to my mind in no way detracts from the effect. The shafts of ridicule thrown by ADDISON and POPE showing how St. George ought to be "in a condition to stick the dragon next April," helped to discourage the practice, and later a complete change of taste, led by "Capability" BROWN, caused good and bad examples of the style to be, for the most part, swept away altogether.

*Use in Shrubberies and Woods.*—As a general rule I do not regard

Yews as well suited to shrubberies, for as they increase in size they tend to crush out the more elegant and delicate subjects, and if in any number they produce an appearance of gloom ; their dense, dark foliage calls loudly for the relief of turf, or at any rate grass, in their vicinity. With regard to Yews, at least, I make my practice square with my precept, so that very few are to be found in the clumps and shrubberies at Aldenham, but sixty different specimens are set out on a large lawn, well separated from one another, and alternated and relieved by flowering and elegant deciduous trees, such as choice birches, maples, American thorns, Japanese cherries, plums, pears, apples, etc., chosen for ornament rather than use. Though they may be unsuited to a shrubbery, Yew trees form a valuable feature in woodland, as they produce a rich warm effect in winter. A little over thirty years ago I planted about 100 in an oak wood of some 12 acres, just outside the Aldenham gardens, and these have done very well. All I did to them in the way of pruning was to remove all boughs within 18 inches of the ground, and to ensure that they had only a single stem. There is only one old Yew at Aldenham, aged about 200 years, which has lost all trace of shrubbiness, and may fairly be described as a forest tree ; its height is 40 feet, its girth at 4 feet above ground 5 feet 1 inch, and the spread of branches 42 feet across. Standing as it does just outside the wrought-iron gate of the kitchen garden it forms the end of an attractive vista for anyone looking down the herbaceous border (fig. 47); indeed, a view of it from the other side of the wall has been utilized for the purpose of advertising their garden seeds by a well-known firm who thought it unnecessary to ask my permission before doing so. Yet even the vanity of a proprietor cannot persuade me that this is more than a fair specimen of an old Yew, though one is glad to own a really old one of any sort. True the height is not bad, for the Yew is never a tall tree ; 50 feet is a very good height for one, and 60 quite exceptional. In girth it is, however, contemptible compared with the various giants throughout the country, which at 3 feet above ground measure over 30 feet ; indeed, one at Buxted, Sussex, is mentioned by Dr. Lowe as reaching 39 feet. Enormous girths on the ground level are also recorded in different places, but of these I take no account, as heaven knows what roots and buttresses may have been included by the tape. The largest Kew specimen, though in no way remarkable, has at any rate bigger girth than mine, for it is 7 feet 6 inches.

*Insect Pests.*—The Yew is subject to a serious insect pest, known to entomologists as *Cecidomyia taxi*, and though I have never detected its presence at Aldenham yet it does great damage in some districts. The insect lays its eggs at the point of a young shoot, which causes it, instead of growing in the normal way, to form a cone or rosette of packed undeveloped leaves, the result in bad cases being for the tree to be covered with dead twigs and to lose nearly all its foliage.

*Moving Large Trees.*—The Yew is a tree which, unlike most others, admits of removal not only without injury but actually, as has been alleged, with benefit, even when it has reached mature age. Many



instances are recorded, of which I will give one or two. A Yew, estimated at 300 years old, was successfully moved from the City of Frankfurt into the country, a distance of two miles, on the advice of Messrs. WILLIAM BARRON & SONS of the Elvaston Nurseries. The same firm was also successful in moving some 60 yards the famous " John Knox " Yew away from the windows of Lord GLENCAIRN's house at Finlayston, near Ladybank, under which the divine is known to have preached. Although this tree with the soil attached to its roots weighed nearly 50 tons it was reported to be " growing better now than before it was removed." More famous still is the case of the Yew in Buckland churchyard which, in 1880, was moved 50 yards by the same firm to admit of the enlargement of the church. This indisputably very old tree is popularly believed to be the one mentioned in Domesday Book, and if that be true, it must have been at the time of removal well over 900 years old, yet such removal was carried out without its health being injuriously affected.

*Sex of Yews.*—The English Yew, generally speaking, is dioecious, that is to say the male and female flowers are borne on separate plants, but once in a way a branch carrying female flowers will be found on a male; this phenomenon I have found also in the case of a male *Hippophae* at Aldenham, though in that genus I believe it to be very unusual. Certainly from the gardener's point of view this is much the more convenient arrangement, as he is not then compelled to find room for the fruitless male in order to secure the welcome ornament of fruit. In springtime the sex of a male tree becomes very obvious if one happens to knock against or shake the boughs, for then clouds of saffron-coloured pollen are released, which that close natural observer TENNYSON refers to in " In Memoriam " as " living smoke."

*Wild Trees in England.*—The great grove of old Yews growing wild on Mickleham Downs, near Leatherhead, is too well known to need description here; but two years ago I paid a visit to the almost equally famous Yew grove at Kingley Vale, near Chichester, where hundreds of fine old trees, a natural product of the district, are scattered over a large acreage of rolling grass land, and produce a very impressive effect, though I could wish that the Ducal owner would go to the expense of removing the self-grown white thorn and elder bushes which are allowed to obscure, disfigure, and in some cases seriously injure the noble Yews. Ridiculous estimates have been given of their probable age, and Dr. LOWE quotes one flowery writer who pictures " the sea-kings from the North landed on the coast of Sussex " gratifying their taste for arboriculture by the sight of these very trees! Personally, I quite confirm Dr. LOWE's view that, grand as some of the specimens may be, none " exceeds 15 feet 4 inches in girth, or possibly about 500 years in age." In VEITCH's " Manual of Coniferae " the view is expressed that " the long and continuous demand for Yew bows has led to the extermination of the Yew in its wild state." Frankly speaking, I altogether disbelieve this notion, and think it infinitely

more probable that such extermination, so far as it has occurred, is due to the increase of population and of agricultural cultivation.

*Relative Hardness of Green and Golden Forms.*—Mr. T. B. HATFIELD, who for many years has been gardener at Wellesley, a fine place in Massachusetts, where they make a special feature of such Yews as can stand their severe climate, has been good enough to send me rooted cuttings of some of the more interesting varieties grown there. He has told me, in the course of correspondence, that the variegated forms of *T. baccata* have undoubtedly proved hardier than the green. This is interesting, and it may be that investigation along these lines will some day disclose that which up to date is still unknown—why it is that one plant should be frost-resistant and another not. My experience so far bears out Mr. HATFIELD that I have found in another genus, at Aldenham, *Cupressus macrocarpa lutea* to be far less liable to winter injury than the green type.

*Timber.*—I have often wondered why the timber of Yew, with its rich red tone, is not more often used for panelling, for which it seems eminently suited, but I imagine that the difficulty of obtaining a sufficient amount of sound timber, of sufficiently large size, acts as a deterrent. The only case which I can recall where it has been used with success was in the gun-room at Batsford, Glos, where it had been put up in quite small panels, made from trees felled on the property, as the then owner, Lord REDESDALE, informed me. Now I have said enough or, as some may think, too much about the common Yew, so will labour that branch of the subject no farther, but will turn to the numerous varieties of it which have developed under cultivation.

#### VARIETIES OF THE COMMON YEW.

*Taxus baccata adpressa* (Gordon).—For a long time I imagined that this was a true species, apart from *baccata*, and, as Mr. BEAN suggests ("Trees and Shrubs," ii. 580), anyone who did not know that it first occurred in Mr. DICKSON's nursery at Chester, in the 'thirties of the last century, might be forgiven for making the mistake, since it is far more unlike our Yew, superficially, than are recognized species such as *T. brevifolia* and *T. canadensis*. Whether grown as a shrub or a half-standard, it is most ornamental; the leaves are narrow, small, abruptly pointed, and lie very flat; in habit it is dense. In colour it is of a dark grey-green, the underside of the foliage being glaucous. I see from Mr. BEAN's book that this form is female, but it is certainly not a free fruiter, and though I have seen many plants, and some, I should say, quite sixty years old, I have no recollection of any considerable crop of fruit. My best is a half-standard showing a stem 2 feet 4 inches above ground. The whole measures 10 feet in height and 12 feet across the spread; it is about 30 years old. Kew has one rather older and bigger, 11 feet high and 20 feet across, but my friend Sir GEORGE HOLFORD has far the best specimen at Weston-birt, Glos., which is 18 feet high and 40 feet through.

*T. b. adpressa aurea* (Hort.).—A golden form which originated in Messrs. FISHER, SON & SIBRAY'S nurseries at Sheffield, of which I possess a young plant, 3 feet tall, and with a spread of growth 10 feet 6 inches round. The Kew one is 9 feet 6 inches high and 37 feet round. A silver form is also recorded by NICHOLSON, but if this exists I do not possess it, nor indeed do I know of anyone who does, and in fact a true silver variegation, so common in the case of Holly and Box, is very rare in any kind of Yew. I see in the Glasnevin list that *T. b. adpressa argentea* is recorded, but how far the variegation in that case is truly silver, and not merely pale straw-coloured, will be better known to Irish readers than to me.

I can also boast one *T. b. adpressa pendula* (Hort.), formerly called *T. b. tardiva pendula*, which is a free, loose-growing plant with long, slender branches; *tardiva* is an out-of-date synonym for *adpressa*, though in this case the foliage seems to me to show little or nothing of the flattened *adpressa* character. I suspect it of being a weeping form of the common Yew, and though it is quite distinct from *Dovastonii* or *gracilis pendula*, I find it quite impossible on paper to make clear where the difference is. My plant was given me by a Quaker gentleman named MORRIS, living near Philadelphia, which, as I have said, is about the northern limit on the eastern side of America where the climate permits forms of our Yew to survive the winter.

There is also at Kew a large plant of an upright variety, viz., *T. b. adpressa stricta*. It has been there since 1876, and has attained a height of 15 feet and a circumference of 57 feet. My specimen is only 5 feet 4 inches in height by 2 feet 6 inches across.

I also possess a plant under the name *T. b. adpressa variegata*, for which I am indebted to the authorities at Glasnevin, and which measures 4 feet 3 inches tall by 2 feet 4 inches in diameter; this is not a silver variegation, but, being paler than the average golden, may best be described as deep straw colour.

*T. b. argentea* (Loudon) was not to be found at Aldenham until this year, when the Director of our National Collection kindly sent me two small plants, but at Kew there is one 7 feet 6 inches high and 45 feet round. There is no record of when or whence it came, so its age must be a matter of guess-work. The Kew plant has a spreading habit, and in winter a glaucous or grey-green appearance, while the variegation, which is quite inconspicuous in winter, if not strictly white, is a very pale yellow.

*T. b. aurea*.—The "Golden Yew" has of late years become very popular, and is frequently to be seen in villa gardens. I have failed to discover where or when it originated, but I think that it is a fairly modern introduction, for it is not mentioned in NICHOLSON'S "Dictionary of Gardening," where some thirty varieties of Yew are given. My copy, in accordance with a too common modern habit, bears no date, but I have learnt that it was published in 1885. It is true that a Yew under this name is recorded by CARRIÈRE in 1855, but whether he is speaking of the same Yew as the one so widely spread

nowadays I am not sure, and it is possible that he may have referred to the variety which I discuss later on under *T. b. laevigata*. In further proof that this variety is of fairly recent date I may say that, though I have seen hundreds of plants, I have never come across any materially older or bigger than some growing here ; these are at most 45 years old, and the best example has a spread of 18 feet in diameter and a height of 10 feet 6 inches ; as it increases in age I should judge that the width would greatly exceed the height. Indeed, in the case of the big Golden Yew just mentioned, the dimensions were taken in 1920, and during the six years that have elapsed it has grown only 6 inches in height, but 2 feet 6 inches in diameter. Like almost all plants except the *Aucuba*, in which some deficiency of chlorophyll lends a golden tinge to the foliage, it needs full sunshine to bring the abnormal colouring to perfection. The habit of this kind is very different from that of the natural Yew, for it is obstinately shrubby, and not only never makes a central stem, but has no branches which are much more than an inch through ; it is compact in growth, and a desirable shrub, especially in spring and early summer, for those who do not object to any yellow tone in plant life (fig. 48). The best Kew plant, which was bought in January 1872, is 12 feet 6 inches in height and 72 feet in circumference. Mr. A. OSBORN, writing thence to me, calls attention to the markedly reddish tinge of the young wood. There is also a fine old Golden Yew at Westonbirt about 40 feet high, but I am not clear whether it is this variety or that described as *T. b. laevigata*.

*T. b. aurea aldenhamensis* (Gibbs).—The plant at Aldenham which I have thus named to distinguish it, owing to its marked difference from the type in its more brilliant and decided variegation and in the quantity of effective plumose growths, is depicted in fig. 49. It is 7 feet 6 inches in height and about 54 feet in circumference. I know of no other place where this attractive variety is grown.

*T. b. aureo-variegata* (Hort.).—I do not grow this, but it is finely represented at Kew by a plant of unrecorded age which is 10 feet in height and 70 feet in circumference. There is a yellow tinge to the foliage, but the young shoots are green ; indeed, in winter, few Yews make a great show of variegation, as it turns dull, and in some cases seems temporarily to disappear.

*T. b. Barronii* (Barron).—Kew has a plant obtained in 1891, and which must accordingly be nearly 40 years old. It has a height of 7 feet and a circumference of 42 feet. Mine, which is a rooted cutting of theirs, is 6 years old, has a height of 3 feet 4 inches and a circumference of 5 feet. Kew had but one sex until I sent cuttings of a female plant, which I bought from BARRON'S in 1920 ; it is 9 or 10 years old, 4 feet 3 inches high, and 7 feet in circumference.

*T. b. brevifolia* (Hort.).—The plant at Kew is 6 feet high and 27 feet round, but no note has been kept of its age, date of planting, or provenance. Some day, when posterity is disputing as to whether these Yews are 200 or 2,000 years old, how devoutly the absence of such a record will be regretted ! My only representative of this

unfortunately named variety (seeing that the Californian species is also so called) is a rooted cutting of the Kew plant, which as yet is only 10 inches high. The only distinctive feature which I can record beyond the fact that, as its name imports, the leaves are shorter than those of the type is that they take on a bronzy tone in winter.

*T. b. Brocklebankii* (Hort.).—This is a golden form of “Irish,” much in the style of *T. b. fastigiata aurea*. I got cuttings from a neighbouring garden, and fancy that the plant may have originally come from LANE’S nurseries. It is not mentioned in any of the books, nor is it grown at Kew. My little plant is under a foot high.

*T. b. cheshuntensis* (Paul) is a seedling of the “Irish Yew” which has been fertilized by pollen from the type, and is about intermediate between its parents; the leaves on its ascending branches are dark green above and greyish below. The Aldenham plant, which is irregular in shape and rather straggling, is 4 feet 3 inches high and 6 feet 6 inches in diameter, being 14 years old. It is not grown at Kew. This form must not be confused with *T. b. cheshuntensis*, a name suggested by Mr. HORNIBROOK for *T. b. nana*, he being unaware that the name was already appropriated for the above-described plant.

*T. b. columnaris* (Carrière).—This is another Irish seedling, with small variegated leaves, green with golden edging. It is smaller than and distinct from *T. b. fastigiata aurea*. It is a slow grower, rigidly upright, with few branches, pressed tightly against the leader. Even in width from base to summit, and extraordinarily narrow in circumference, Mr. HORNIBROOK lucidly describes it as “looking like a folded umbrella”; it was he who gave me my little plant, now 6 inches high, in September 1925. Mr. HORNIBROOK’S own specimen, growing at his former home, Knapton in Queen’s Co., in 1920 was 4 feet high and about 6 inches through. Kew does not grow it, but though the Director may be sick of the number of *baccata* varieties, I think it should be grown there, its habit being so exceptional.

*T. b. compacta* (Beissner).—Neither is this to be found at Kew. Like *T. b. pygmaea* and *T. b. nutans*, this is a dwarf production of the DEN OUDEN nurseries, whence I obtained it in 1923, its size being 1 foot 9 inches in height and in width. It grows rather more freely than the two above-mentioned dwarfs, and takes on a compact conical shape. Leaves “fairly broad, arranged radially, a dark shining green.”

*T. b. contorta* (Hort.).—This curiosity has just been secured for Aldenham owing to the kindness of the Director of Kew, where there is a plant, obtained from Professor SARGENT in 1893, now 10 feet high and 24 feet round, a contrast to my gem, which is only 14 inches tall.

*T. b. contortifolia* (Gibbs) is a marked leaf variant, more deserving of a varietal name than many that are so graced, because, to note the difference, one has not to put one’s head into the bush, for the distinction stands out quite at a distance. It originated at Aldenham, and so far I have not struck cuttings for distribution, but I believe

I sent some to Kew a while ago, but whether they have yet been successful with them I do not know. The leaves are curiously crumpled, a feature which shows more on the young growth than the old, but the branches and branchlets appear to be of the ordinary type. The plant is 12 feet tall, with a diameter of 10 feet 6 inches, and is growing on a half-standard about 2 feet high.

*T. b. Davidiana* (Hort.).—The account which I have previously given of *T. b. Brocklebankii* applies word for word to this; the only difference that I can observe, after examining the mature plant in a neighbour's garden, is that this is the more fastigate of the two.

*T. b. Dovastonii* (Carrière).—The original plant was bought for sixpence from a cobbler by one JOHN DOVASTON, of Westfelton, in Shropshire, not on account of its unusual habit, but merely that its roots might hold up the crumbling sides of a well, which duty I believe it has faithfully performed. In 1909 it was 37 feet high and had a girth of nearly 4 feet at 4½ feet above ground. My plants of both *Dovastonii*, the "Westfelton Yew," and of its variety, *T. b. D. aurea*, are good-looking standard trees. The latter is presumably the same, or nearly the same, as the one labelled in the Glasnevin Botanic Gardens *T. b. D. variegata*. I remember seeing a plant of *T. b. Dovastonii* at a place called Poles in this county (Herts), which was quite low, nowhere more than 4 feet, but, planted on a lawn and with a circumference of over 50 feet, it had a most luxuriant and attractive appearance. The Kew plant is 13 feet high and 56 feet in circumference. One of mine is grafted on a tall clean stem and has very long and only slightly pendulous horizontal boughs; it grows above a jutting rock overhanging a little stream and is most happily placed (fig. 50); another is 4 feet 6 inches high and about 15 feet round, while the golden form is 6 feet 2 inches high, but only about 13 feet round. The fine Kew golden one, which is called *aureo-variegata*, is 8 feet high and as much as 75 feet round. This was presumably planted in or about 1872 by Sir JOSEPH HOOKER, who was responsible for the planting of the larger specimens of the genus in our National Collection.

*T. b. elegantissima* (Beissner).—I have a small, compact, fastigate Golden Yew labelled *T. b. elegantissima*, but as that varietal name has been applied to a form of *T. b. horizontalis* already it seems a great pity to use it also for a fastigate one. As I have often remarked elsewhere, it is devoutly to be wished that nurserymen, before giving names of their own to sports and variations from type which occur in their gardens, would submit the suggested nomenclature to Kew, or some other good authority, that they might know if there be any objection to it on literary or botanic grounds. If that happy consummation could be reached, we might avoid any increase both in the duplication of names and in the ghastly grammatical blunders which disfigure works on botany. A crime of the same kind (though "crime" is perhaps too harsh a word) was committed by my old friend GEORGE PAUL, "a lover of trees" now unhappily lost to us, who, finding a dwarf form in his Cheshunt nursery, sent it out to me

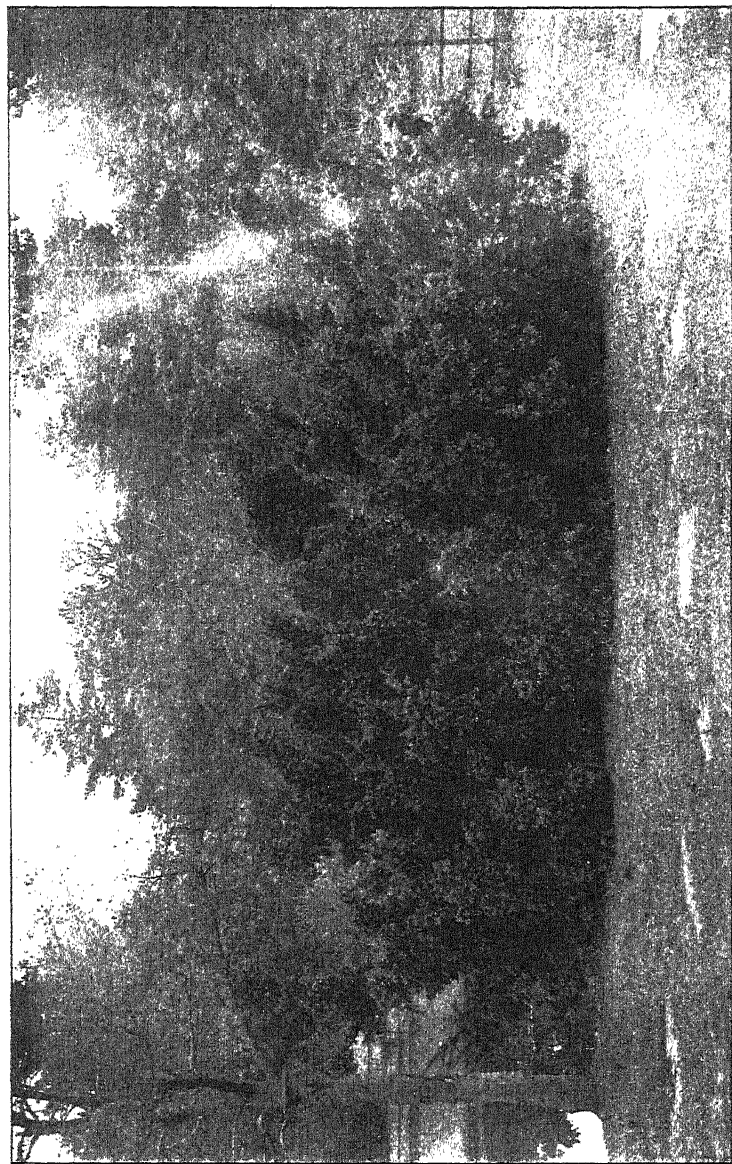


FIG. 49.—*TAXUS BACCATA AUREA ALDENHAMENSIS*.

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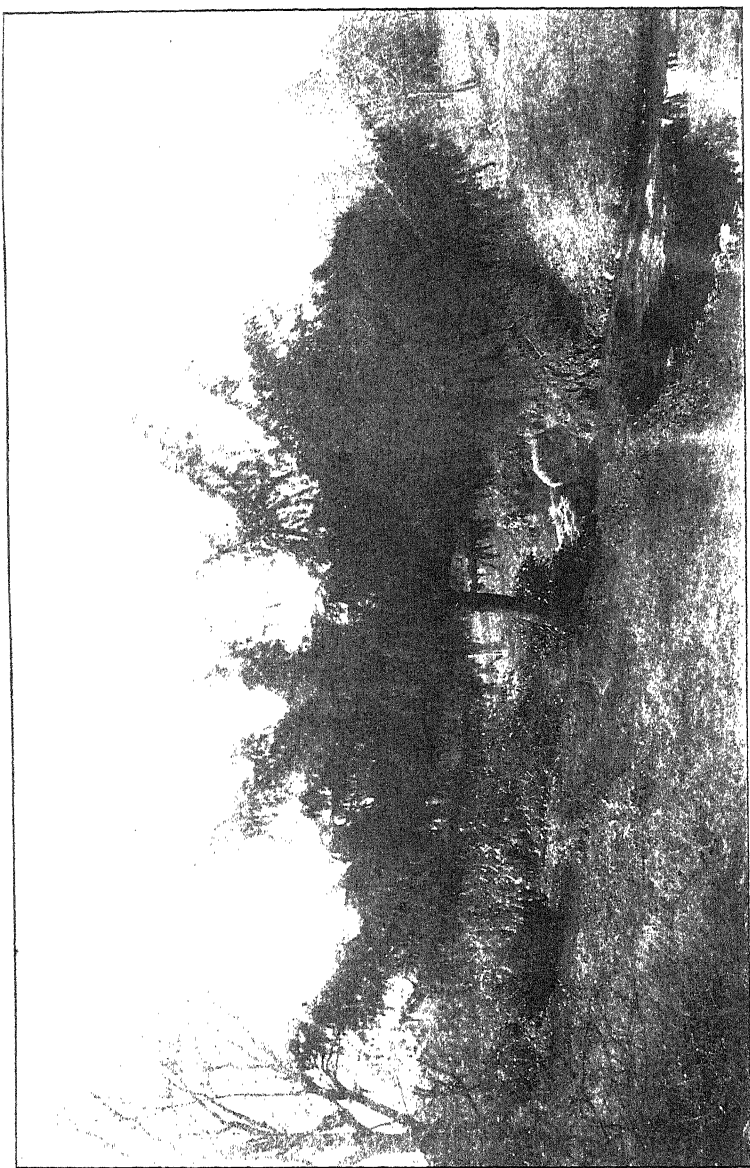


FIG. 50.—TAXUS BACCATA DOVASTONIL.



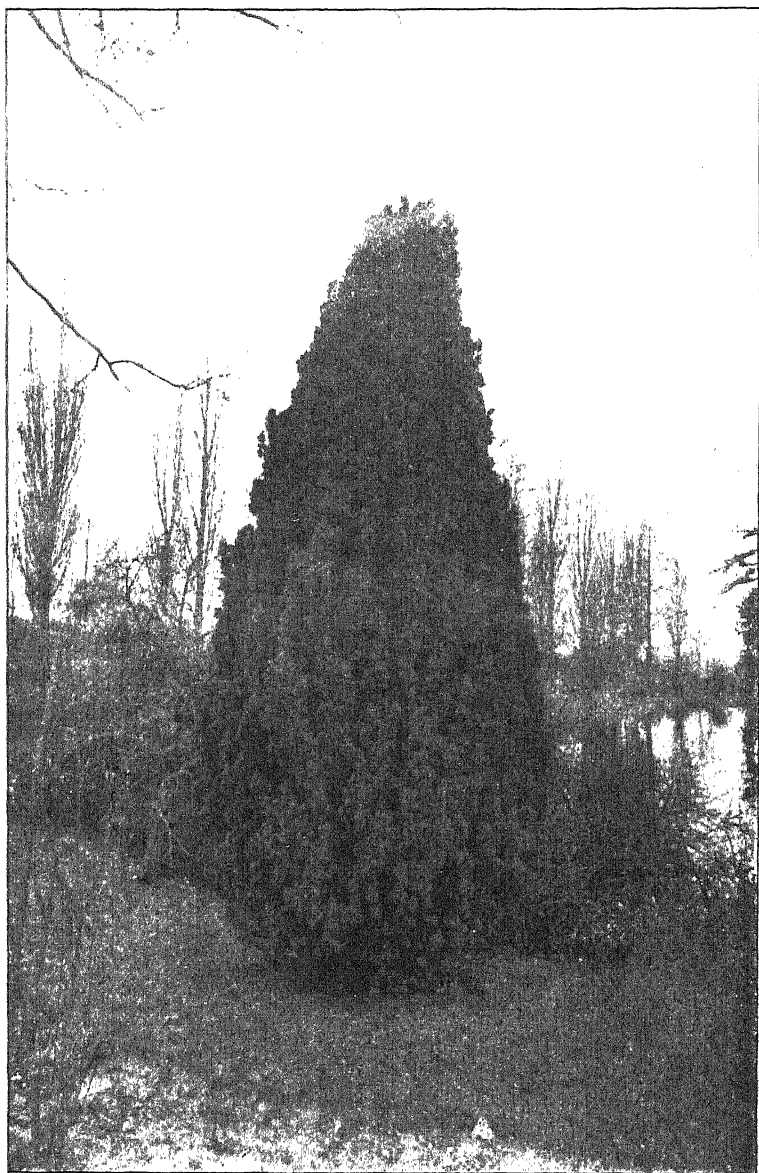


FIG. 51.—*TAXUS BACCATA FASTIGIATA*.

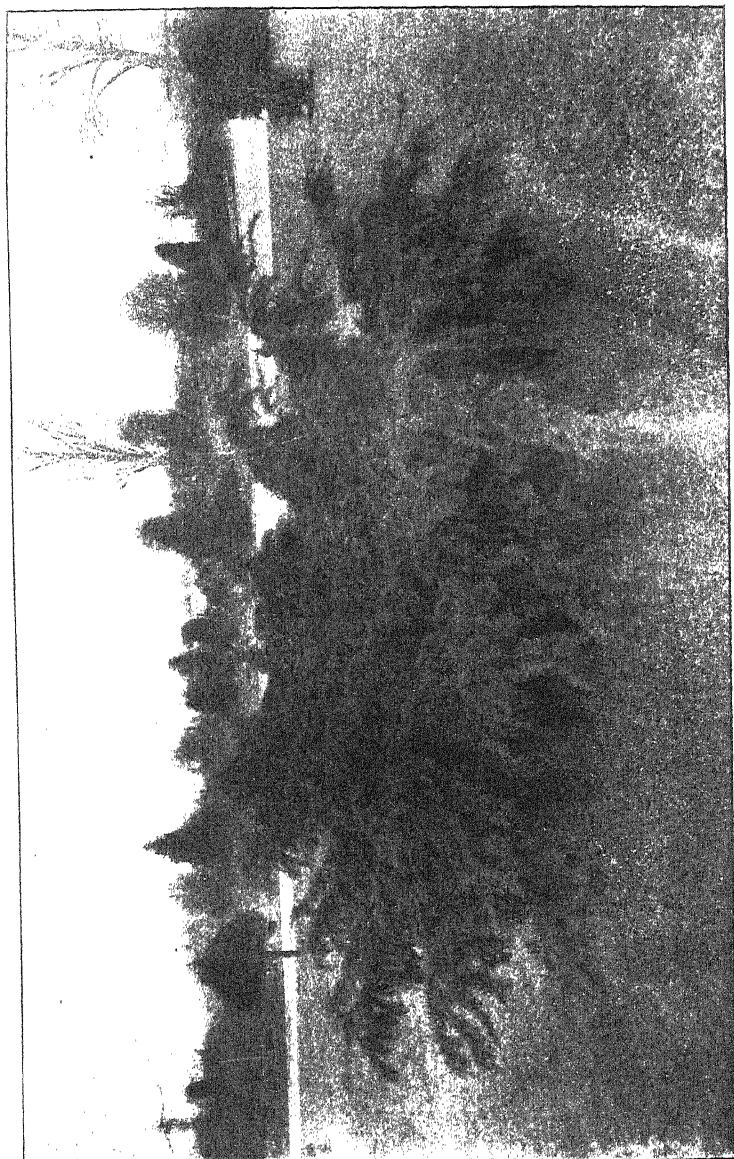


FIG. 52.— *TAXUS BACCATA GRACILIS PENDULA*.

*To face p. 201.*

amongst others under the name *T. b. nana*, ignoring the fact that another variety so named was already in existence. It was not until I had possessed PAUL's plant for several years that I became aware that I had not got the true *T. b. nana* (Knight), and even now I have but a youthful rooted cutting ; but the form introduced by PAUL has been renamed, with Kew's approval, *T. b. Paulina*, under which name it will be dealt with in this article.

In illustration of what I have just written, I often wish that when some hypothetical nurseryman, say Mr. Smith of Tooting, finds in his seed bed a stunted little Yew, out of which he thinks money could be made if he were to give it a distinctive name, and put it in his catalogue as "a miniature novelty which no good rock-garden should be without," he would, before taking the irrevocable step, write to the Director of Kew (who is always ready to help both tradesmen and amateurs), submit his sample, and inquire if there were any objection to his calling his new find "*Taxus nanus*." He would then get something like this answer : "There are three objections to the name suggested, (1) you have omitted the specific name *baccata*, which must always follow that of the plant ; (2) the proper form of the varietal name in this case should be *nana*, not *nanus*, as the Latin word *Taxus* is feminine ; (3) most important of all, there are already three distinct varieties of *Taxus baccata* in cultivation to which the name *nana* has been given. We think it doubtful whether your plant deserves a name of its own, but if you have had it for a sufficient time to be confident that its dwarf habit will be permanent there would be no objection to your calling it either *Taxus baccata minima*, or *T. b. Smithii*, according as you wish to call attention to its dwarf growth or to the fact that you are its introducer." If such a course were always adopted in the case of new varieties, we might still be burdened with some unworthy either of name or cultivation, but at any rate we should be spared most of the blunders and confusion which now trouble plant lovers.

*T. b. epacroides* (Hort.).—This is very rare in cultivation, and it is my specimen which is described in HORNIBROOK's book ; indeed, I believe he told me he had seen it nowhere else. It is well named, as its lightish green very small short foliage, growing at right angles to the twigs, does recall an *Epacris*. It is an attractive dwarf, with a disposition to spread. My bush has now reached a height of 4 feet 6 inches, with a diameter of 4 feet 8 inches. As time goes on its width is bound greatly to exceed its height. It is not grown at Kew. In VERTCH's "Manual of Coniferae" it is wrongly regarded as being synonymous with *T. b. ericoides*.

*T. b. erecta* (Loudon).—The "Fulham Yew," or "Broom Yew," as its varietal name suggests, bears vertical branches ; of it I have only a rooted cutting, hardly 4 years old, and 7 inches high. Kew, on the other hand, has a fine old plant, though any record of its date of acquisition is lacking ; it is 24 feet high and 87 feet in circumference. Compared with the Irish Yew, it is very much broader in

proportion to the height, and is not so severely fastigate in habit. Its leaves are smaller than those of the type.

*T. b. erecta aurea* (Barron?).—This is a golden form of the foregoing. My plant is about 16 years old, bright and striking-looking, 6 feet 6 inches high, with a spread of 7 feet 6 inches. I got it from a nurseryman under the fancy garden name *T. b. brilliantissima*, which its appearance certainly justifies. In an old catalogue of BARRON'S it is described as "of a rich golden colour with no green stripes on the leaves." This variety is missing at Kew, only the green form being grown there.

*T. b. erecta Overeinder* (Hort.).—This, as its name suggests, is a Dutch variety, and Mr. CHEAL, from whom I bought my plant, tells me that he saw a fine specimen in Holland in 1900, which was 10 feet in height, and "a perfect flame-shaped tree that had not been clipped," which I take to mean a narrow column with a sharp apex. If I am right, it can hardly be synonymous with *T. b. pyramidalis*, as some people regard it, for that should have a broad base and narrow apex. Unfortunately I lost my old plant, and the present one—2 feet 10 inches high, with a diameter of 3 feet—is not big enough for me to give a good description of its habit, as I could have done were it approaching maturity. Kew obtained a small plant from Messrs. BARBIER of Orleans in 1925.

*T. b. erecta semper aurea* (Beissner): syn. *T. b. semper aurea* (Dallimore).—The older name should have precedence. This is a decidedly handsome, brilliantly golden form of upright habit, but not so narrowly fastigate as the Irish. It is one of the best for maintaining its brightness in winter, and in this respect is far superior to the common *T. b. aurea*. It is 6 feet high and 3 feet 6 inches across. I got it in May 1920 from Mr. SLOCOCK, who has a large and well-grown assortment in his nurseries. The one at Kew, bought in 1900, and about 30 years old, is 9 feet high and 45 feet round.

*T. b. ericoides* (Carrière).—It illustrates the extreme difficulty of writing a paper on Yews, that I was just on the point of going to press with this when I discovered that the minute and elaborate account that I had given of a plant masquerading under this name in my garden referred to a variety of *baccata* which, whatever it may be, is certainly not *ericoides*, which I now realize, to my regret, I do not possess. Nevertheless the false plant was given to me by Mr. T. D. HATFIELD (to whom I have previously made reference), who lives in Massachusetts, and has undoubtedly a wonderful knowledge of Yews. Anyone may be led astray in this matter, a fact of which I am painfully aware. The true *ericoides* is a slender, slow-growing, dwarf form with dark, very small, much-crowded leaves, and is contemptuously referred to by BEAN as a "mere curiosity," though to my mind the minuteness of the foliage, and its genuine resemblance to some of the Cape Heaths, makes it well worth growing. In VEITCH'S "Manual of Coniferae" this variety is stated to be only a synonym of *T. b. epacroides*, but this is not so, for not only is its general look distinct,

but the leaves are shorter, smaller, and, instead of being set flatly at right angles to the twigs, stand out all round them in a bottle-brush formation. Kew has an old plant, acquired 50 years ago, which measures 7 feet 6 inches in height and 21 feet in circumference.

*T. b. expansa* (Carrière).—This is an attractive, free-growing, procumbent form, not far off *T. b. Dovastonii* and even nearer *T. b. horizontalis*. My plant is 2 feet 3 inches high, with a spread of 5 feet across. It is still quite young, not more than 8 or 10 years old, I should think; as it gains in circumference, it should make a very good effect in isolation on a lawn, but it would not be suited to a shrubbery, as it would be too wide for the front rank, and, from its want of height, would be lost to sight if there were many plants growing in front of it. The largest specimen at Kew is 15 feet high and 57 feet round. The plant grown at Glasnevin as *T. b. nana* (not KNIGHT'S or PAUL'S), to which I have given the name *T. b. parvula* (Gibbs), is very much in the same style as this, and HORNIBROOK suggests that it should be named *expansa*.

*T. b. fastigiata* (Loudon).—Under the name of the "Irish Yew," this is as well known as the typical form, and whether green or with golden variegation is an exceedingly useful plant, either singly at the end of a walk or in pairs at the side of it; in fact, anywhere where something hardy is wanted, which can be relied upon not to sprawl about and interfere with its neighbours. Sometimes, after heavy snow, branches may require to be tied in, and where the head, as occasionally happens, shows a tendency to fall apart this can be easily remedied by cutting off the top a foot or eighteen inches, and closely wiring together the new apex. The original plant, found in 1780, from which all others have been developed, directly or indirectly, by rooted cuttings, is known as the "Florence Court Yew," and it and consequently its offsprings are female. If the seeds are sown, the resulting plants, having been fertilized by the common Yew, usually revert to type, but occasionally take on forms intermediate between the parents. My best plant is only 15 feet high and 25 feet round (fig. 51). The fairly good one at Kew beats mine by 3 feet in height and 5 feet in circumference.

*T. b. fastigiata argentea* (Nicholson), a variety described as having the tips of the branchlets cream white, is not grown at Aldenham, and I have never even seen it except at Kew, where there is a plant 6 feet 6 inches high. CARRIÈRE treats this as synonymous with *T. b. fastigiata variegata*, and calls it a rather delicate plant with leaves striped with white.

*T. b. fastigiata aurea* (Standish), or "Golden Irish Yew," is of course far commoner than the silver form. It is very bright, though not so bright as the variety *T. b. f. Standishii*. My best plant is 10 feet 6 inches high and 3 feet in diameter. Kew has several examples but none so tall as mine: they range from 6 to 8 feet in height.

*T. b. fastigiata grandis* (Hort.).—Another which approaches the Irish in its manner of growth, but my specimen is scarcely big enough

to enable me to speak decisively of its merits. It is 3 feet high, with a circumference of 6 feet, and is about 10 years old. Kew has had a plant since 1911, now 7 feet high and 6 feet in circumference, being about 18 years old. Though this and mine come from the same nursery (FISHER, SON & SIBRAY), where it originated, this is much narrower in proportion to its height. BEISSNER calls it *T. b. fastigiata aureomarginata* (Fisher) and says that it is a beautiful upright male form originating as a sport. Of course, the number of names given by nurserymen to plants of this genus which vary somewhat from the type in growth is almost infinite, and it is neither possible, nor even desirable, to possess them all. I can illustrate the truth of the last remark by mentioning that the Director of Glasnevin kindly furnished me in 1920 with a list of all the varieties of *T. baccata* which were grown at Glasnevin—43 in all. Now, though my own collection was equally extensive (it now comprises 50 or more *T. baccata* forms alone, besides other species), yet there were no less than 24 of those then watched over by Sir FREDERICK MOORE which I did not then possess, and 22 which did not appear in the old Kew List. A form from Messrs. FISHER under the name *T. b. f. g. vera*, now 2 feet 8 inches high by 10 inches through, does not differ markedly from the Irish Yew.

*T. b. fastigiata Standishii* is a specially handsome golden form of "Irish Yew," in which the young leaves grow in crowded bunches or clusters, giving a bottle-brush effect. My best specimen, acquired in 1920, is 6 feet 4 inches high, with a spread of 2 feet; it is about 12 years old. It was not to be found in the collection at Kew until I had the pleasure of sending cuttings there in 1922.

*T. b. fastigiata* seedlings from Wellesley, in Massachusetts. I have three or four different rooted cuttings which my kind American friend propagated for, and sent to, me about six years ago, considering them sufficiently distinct from the ordinary Irish Yew to repay his trouble; the tallest of them is now only 4 feet high, and none is yet sufficiently developed to enable me to point out any marked difference from the old and well-known one.

*T. b. fructu luteo* (Loudon).—This is a handsome form of the common type, which is recognizable, even when not in fruit, by the yellowish colour of the leaf-buds and young wood; unfortunately it cannot be depended upon to come true from seed. A cousin of mine raised a large quantity—several hundreds, indeed—without, as far as I could see, getting one which showed promise of bearing yellow fruit, and a few years since I made the same experiment on a smaller scale with nearly the same negative result, though latterly one or two of the seedlings show a yellow tone in the wood. The finest specimen of this variety which I have ever seen is in the pleasure grounds of Tortworth Court, and belonged to that famous lover of trees and old friend of my own, Lord DUCIE. He was, I may add, a lover of dogs as well as of trees, and the Yew stands among many tombstones marking the spots where canine friends lie buried. It is strange to me that the fact of yellow-fruited Yews having yellow wood is unnoticed in any books which I

have examined, nor is this feature confined to the genus *Taxus*. My best plant is 15 feet high, with a circumference of 33 feet, and the much older one at Kew is 19 feet high, with a circumference of 57 feet.

*T. b. glauca* (Carrière).—Popularly known as “Blue Jack,” this is a strong-growing, distinct form, and the only one, as far as I know, which has bluish-grey foliage. In my experience I have never come across one with a single stem which gave any prospect of making a tree. All that I have seen are vigorous bushes, of which the spread was but little less, if at all, than the height. Unlike Australia, in the foliage of the British Isles a blue-grey colour is far from prevalent, and all trees or shrubs in which it occurs are worthy of encouragement. My best specimen of “Blue Jack” stands 10 feet tall, with a spread in diameter of exactly the same measurement, and is, I should say, about 30 years old. The far finer one at Kew is double the height, and goes about 17 feet in diameter.

*T. b. gracilis pendula* (Lancke).—This is a very graceful weeping Yew, with slender stem and horizontal, sub-pendulous branches. BEAN speaks of it as “of the *Dovastonii* type.” I have several fine specimens of weeping Yews, grafted high up on *fastigiata* stock, some green and some golden. Whether they should be called *Dovastonii* or *gracilis pendula*, or simply *pendula*, I am not clear, nor does it greatly matter. Several of them originally had the branches of the Irish type on the stem, with the weeping boughs above, but in this condition they did not please me, looking as they did very unnatural and “freak” plants. In every case I have now had the fastigate branches removed from the stem, greatly, as I think, to the advantage of their appearance. *T. b. gracilis pendula* has longer, slenderer, and less pronouncedly drooping branches than the variety *T. b. pendula*, and is said to make a bigger shrub. My charming young plant is 4 feet 6 inches high and 2 feet 6 inches in diameter (fig. 52). This variety is not represented in the Kew collection.

*T. b. Handsworthii* (Hort.).—I have but a tiny plant of this, only 9 inches high, and Kew has none at all. This was obtained from the same source as *T. b. Brocklebankii* and *T. b. Davidiana*, and the parent tree is a strictly Irish type, but distinct in appearance from *T. b. fastigiata* and the form *Standishii*, and is one of those variegated forms in which the golden colour fades and almost disappears in winter.

*T. b. horizontalis* (Knight).—This has the branches horizontal and standing out flat from the trunk, but the branchlets do not weep as in the case of *Dovastonii* and *gracilis pendula*: indeed, the secondary growths are inclined to be erect; it is a vigorous grower. I possess but a young plant, 6 inches high, with a spread of 2 feet 6 inches, and I have a variety of it, between 3 and 4 years old, and only 10 inches tall, raised from a cutting, which is known as *T. b. h. elegantissima* (Hort.). Of this variety I have a much larger specimen grafted on a tall stem, which came to me from a nurseryman, labelled *T. b. h. aurea* (Hort.). Figure 53 gives a very good idea of its habit. Kew has fine old plants of both, *T. b. horizontalis* being 10 feet high, with a

circumference of 78 feet, and its "most elegant" variety measuring a foot higher, with the same circumference. One of my plants is flat on the ground, without any stem, and I cannot help thinking that the Kew plants must be grafted on a common yew standard.

*T. b. laevigata* (Hort.).—Besides the ordinary "Golden Yew," I have another golden form, which we call the "Old English Golden Yew," and which FISHER, SONS & SIBRAY tell me is known to some as "*T. b. laevigata*," though no such name appears in the books, and I have failed to find out whether there is any other and more correct name for this old golden form. It is quite distinct from, and has been in cultivation much longer than, *T. b. aurea*, for there are very big plants in a Somersetshire garden which must be at least a hundred years old. It is nowadays rarely met with, and is not generally, I think, in trade, having been displaced by the better-known *T. b. aurea*, to which it is inferior in brilliancy when in young growth, though, to my mind, certainly superior in winter. In habit it resembles the type, having either a central stem, or, when this has been injured, or undeveloped, making stout, free-growing lateral branches. As it develops it wants a good deal of room, and is therefore far less suited to a shrubbery or a small garden. It does not appear to be grown at Kew, where I should have expected to find it. My plant is 4 feet 9 inches high, and has a diameter of 6 feet 6 inches; but it had to be heavily cut back when moved some 6 or 7 years ago—an operation from which it took a long time to recover—so its age (? 20 years) is much more than its size would indicate. There is too a fine plant at Westonbirt, 40 feet high with a girth at 4 feet above ground of 5 feet 4 inches. I have not been able to decide certainly if it be this variety, but its size makes it impossible that it should be *T. b. aurea*.

*T. b. nana* (Knight).—I cannot better HORNIBROOK's description of the plant as grown at Glasnevin. "A low pyramidal bush of open growth, 2 feet 6 inches high, and about the same through, branches few, stiff and ascending, leaves very short, thick and variable in shape." NICHOLSON calls it a "dwarf, dense, conical bush." Unfortunately, I have only a small rooted cutting, though I have the much later development to which PAUL of Cheshunt gave the same name, as related above (*T. b. Paulina* now), in bigger size.. Both BEAN and DALLIMORE, when writing of *nana*, appear to refer to a different plant, not KNIGHT's, but one which has been grown at Glasnevin for years under the same name, but which will in future be known as *T. b. parvula*. At Kew Gardens the true *nana* has been grown under the garden name of *Foxii*, a plan which I gladly note from the new Hand List is now abandoned. Kew has only small plants of PAUL's *nana* which I have had the honour of sending there. One of the many disadvantages of nurserymen giving a name to a new variety which has already been taken for an older one is that it turns the garden of the innocent buyer into a "Fool's Paradise" in which he fondly believes that the true plant is growing, and therefore makes no effort to obtain it.

*T. b. neidpathensis* (Dieck).—An old variety, more columnar than



pyramidal in shape, and stated by NICHOLSON (though my plant has not yet shown this feature) to tend, when full grown, to spread at the top. It originated at Neidpath Castle, Peebles, and came from BARBIER ET CIE., of Orleans, in the spring of 1913, to Aldenham. My best plant is now 6 feet 2 inches high and over 11 feet in circumference, being, I should guess, 16 years old. Kew's specimen, acquired in 1898, is now 10 feet high, and has a circumference of 57 feet.

*T. b. nutans* (Beissner).—This is a Dutch dwarf which originated in DEN OUDEN's nursery at Boskoop. My plant is 20 inches in height and the same in diameter; it was bought from SMITH of Newry in January 1920. It is not grown at Kew. The following account is taken bodily from my friend HORNIBROOK's "Dwarf and Slow-growing Conifers," and I hope he will forgive a theft which is, in truth, a tribute of admiration. "Its branches are few and ascending, with deep curving tips. Side branchlets are few and scattered. The leaves are very irregular in size, shape, and distribution. Portions of a branchlet will have leaves mostly up to  $\frac{7}{16}$  of an inch long on one side, and about  $\frac{3}{16}$  of an inch on the other, both pointed and obtuse. Other portions of the same branchlet are apparently bare, but on close examination will be found to be covered with minute, extremely narrow, heath-like leaves, tightly adpressed to the branchlet for almost their entire length, and barely  $\frac{1}{8}$  of an inch long. A most distinct and interesting form, making a dwarf and very open-growing bush."

*T. b. parvula* (Gibbs) is a new name given to the plant formerly called *T. b. nana* (Bean) to avoid the reduplication of the name *nana*. Though described by BEAN (as *nana*) as "of spreading habit," it is not now to be found at Kew except in the form of small rooted cuttings, and the same remark applies to Aldenham. The only specimen of any size with which I am acquainted is that at Glasnevin, which forms there a low spreading bush 2 feet high by 6 feet through.

*T. b. Paulina* (Gibbs).—This is a dwarf form which occurred in GEORGE PAUL's nursery at Cheshunt, and which he, unfortunately overlooking the fact that a plant of the same name was already in existence, sent out as *T. b. nana*. When I discovered—or, rather, when my friend HORNIBROOK discovered for me—that my plant was not the true *nana*, I re-christened it as above, with his and Kew's approval. In his capital book on Dwarf Conifers, seeking a new name for this plant, he unfortunately lighted on the name *cheshuntensis*, being in his turn unaware that it had already been appropriated for another of PAUL's introductions, an oversight, as I know full well, which is but too likely to occur to anyone who attempts to deal with the numerous varieties of *T. baccata*. He informs me that he had no intention of suggesting that the two forms were identical. I grow both plants, and they are as distinct as any such varieties can be, always excepting *T. b. adpressa*. My plant, aged about 10 years, is 2 feet high by 1 foot 10 inches across, a compact grower, showing none of the straggling habit ascribed to the true *nana*; it is well suited to a rock garden, or the front line of a shrubbery. Kew

had cuttings from me in 1922. In an old catalogue of G. PAUL it is illustrated and appears as a very compact cupola-shaped bush.

*T. b. pendula* (Dallimore).—I have a fine specimen of this, well placed as a lawn specimen, but away from the main collection. It is 10 to 14 feet high, but I should explain that it has been grafted on the top of an Irish Yew, the stem now having been cleared of all branches, and is stout and clean. The spread of branches is 30 feet in diameter, and the effect produced is very happy; the branches are stout and markedly pendulous. There is, of course, no leader, and the crown is quite flat. The Kew plant, also probably grafted, 6 feet 6 inches high and 42 feet round, is apparently not nearly so fine a plant as mine.

*T. b. procumbens* (Loudon).—My plant came from Wellesley in 1921; it is 1 foot in height and 2 feet in diameter. The erect stem is about 8 inches high; it then takes a sharp turn downwards and the ends of the branches grow outward at right angles to the stem. Its general appearance is very like one of the Japanese dwarf plants. The Kew plant is 2 feet high and 19 feet in circumference, but their plant does not show the curious growth I have described, so it must either be an individual freak, or else I have an unknown variety under the name *procumbens*.

*T. b. prostrata* (Bean).—A low trailing form, mentioned in the Kew Hand List but not grown at Kew. It is lower and flatter in growth than *horizontalis*, *procumbens*, and other prostrate forms, for it hugs the ground. The finest specimen with which I am acquainted, which has long been growing in Miss WILLMOTT'S rock garden at Warley Place, is only 1 foot high, though 10 feet across. It is to this kind friend that I owe the recent acquisition of a thriving young specimen of this choice variety at Aldenham.

*T. b. pumila aurea* (Gibbs).—This little plant is 14 inches by 14 inches. Unluckily, I have no record of whence it came, or when. It is not to be found in any of the books, nor is it grown at Kew—in fact, I know virtually nothing about it except that it makes the most vivid and splendid splash of gold that I have yet seen produced by this genus. Neither Mr. HORNIBROOK (who specializes in Yews) nor anyone else visiting Aldenham has seen this variety elsewhere, so I have had to stand godfather and give a name which will serve until an earlier one is established.

It is as brilliant as it is rare. So many of the variegated Yews either lose their abnormal colouring so completely in winter that it can only be detected by careful close-at-hand investigation, as is the case with *T. b. argentea*, or at any rate they become dull and unattractive, as happens with *T. b. aurea*, but this variety retains its brilliance all the year round. Certainly *T. b. erecta semper aurea* and *T. b. f. Standishii* are both bright in winter, but they cannot vie with *pumila aurea*, which, as seen compact and squat on the lawn at Aldenham without a single projecting twig, might indeed at a little distance be taken for a burnished outcrop of the precious metal whose name



FIG. 53.—*TAXUS BACCATA HORIZONTALIS ELEGANTISSIMA*.

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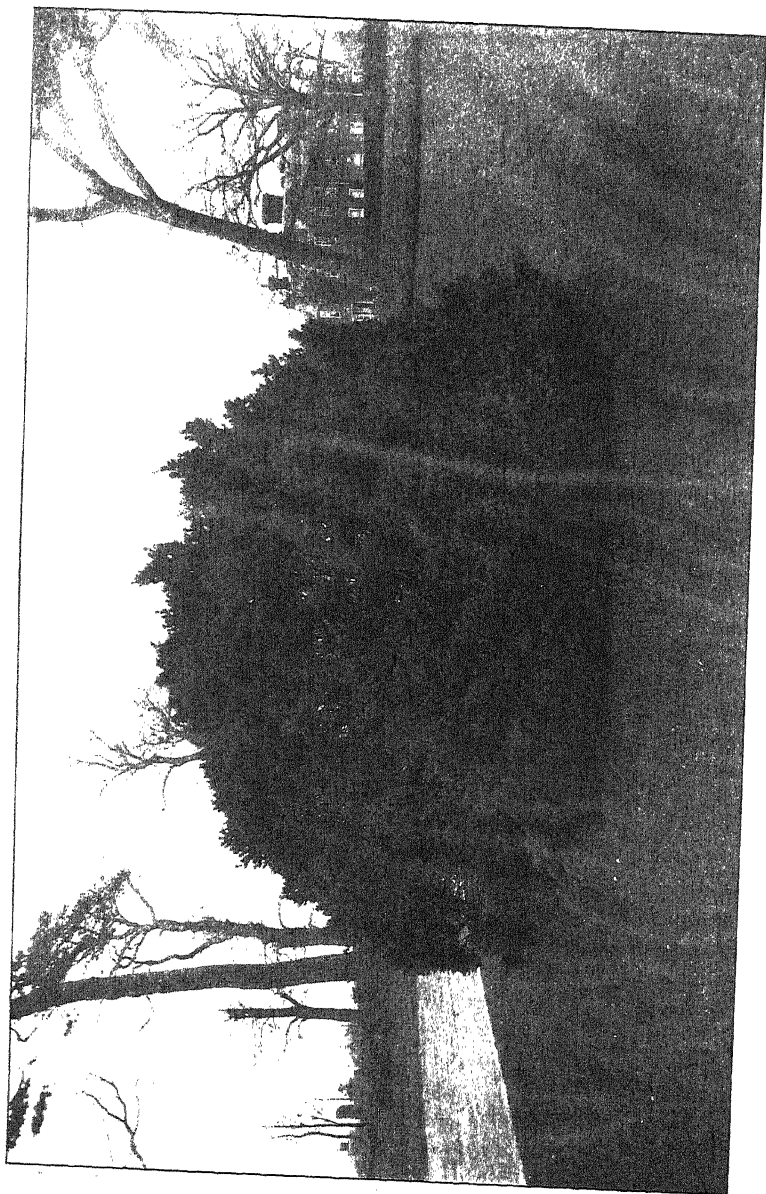


FIG. 54.—*PRUNOPTYS ELEGANS*.

it bears. Instead of being in almost none it ought to grace every rock garden in the country.

*T. b. pygmaea* (Beissner).—This is the smallest form known to me. A tiny dwarf, which, like *T. b. nutans*, originated in DEN OUDEN'S nursery at Boskoop; it is eminently suited for a rockery. My plant was obtained only three years ago, and is but 7 inches high, and still not sufficiently developed to furnish matter for me to describe it properly. According to Mr. HORNIBROOK, "it makes a minute, narrowly ovoid bush, of densely crowded, compressed, ascending branches and branchlets, the annual growth of the latter being about  $\frac{1}{4}$  to  $\frac{1}{2}$  an inch. The leaves are  $\frac{1}{8}$  to  $\frac{1}{4}$  inch in length, crowded, stiff, unusually recurving, oval, and disproportionately wide."

*T. b. pyramidalis* (Lavallée).—This, at Aldenham, is 7 feet high, 3 feet 6 inches in diameter, and aged about 25 years. It must obviously be, in its origin, a seedling of the Irish Yew, but its habit is pyramidal, not fastigiate, for it has a broad base, sloping sharply inwards to a narrow apex. This variety is not grown at Kew. *T. b. p. variegata* (Hort.) is a plant with rather straw-coloured colouring—that is to say, the golden tone is not deep. Mine is a fine specimen, over 40 years old and 12 feet high, with a diameter of 6 feet 6 inches. The still finer one at Kew is 18 feet high, with a diameter of 16 feet.

*T. b. recurvata* (Carrière).—Thanks again to my esteemed friend the Director of Kew, I am able to include this variety in my collection, recording a plant 8 inches tall just received, of which the parent at Kew measures 15 feet tall, with a circumference of 72 feet. It must obviously have been at Kew many years, but there is no record, alas! of age or origin. As the name suggests, the leaves are curved, a not uncommon feature among Yews.

*T. b. semper aurea* (Dallimore).—See *T. b. erecta semper aurea*.

*T. b. Sieboldii* (Beissner).—See *T. cuspidata Sieboldii*.

*T. b. sinensis* (Knight).—This is given in the Kew Hand List as synonymous with *T. sinensis* (Rehder), but a large plant was grown at Kew and a small one at Aldenham, under the above name, which bear no likeness to *T. sinensis*, of which WILSON collected the seeds early in this century. Certainly the plant grown at Kew is nothing more than a variety of *baccata* without any special distinction, and having nothing to do with China. I learn that it is intended to drop the name *sinensis* at Kew. The name *T. b. sinensis* occurs in GORDON'S "Pinetum," published in 1859, long before FARGES, or HENRY, let alone WILSON, had begun collecting in China.

*T. b. wintonensis* (Hillier) was bought by me from HILLIER'S in 1922, and is presumably about 6 years old. It is only 1 foot high and 9 inches in diameter. This is one of the numerous seedling variants with which we have been deluged during the last fifty years. It is of upright habit, and originated at Messrs. HILLIER'S nurseries at Winchester; in its infancy it seemed very distinct, but, in answer to my inquiries about it, that firm have been good enough to inform

me that as it grew older it lost its individuality and distinction, so that they have consequently given up propagating it. I incline to think that they have exercised wise discretion, and that no director of a botanic garden or owner of a private one need put himself out of the way to secure it. This variety is not growing at Kew.

*T. b. Woodwardii* is one of the newest and least known of the *baccata* varieties. It was found in the Wyre forest by ROBERT WOODWARD, one of those who gave their lives for us in the Great War.

*T. brevifolia* (Nuttall).—The "Californian Yew," whose habitat is the whole range of Western North America, is undoubtedly very rare in British cultivation. Rather to my surprise, it is not represented in our National Collection, nor can its absence be excused on the ground of tenderness, and though in a private garden the fact that it is very like our Yew, and in no respect its superior, might be a full and sufficient reason for not growing it, that story will hardly serve when Kew is in question. Since making the above querulous criticism, I have learnt from the Curator that he himself brought back *T. brevifolia* from a trip to the United States, but that it has since unaccountably disappeared. In December 1921 Professor SARGENT sent me two little plants, one male and the other female—for, like ours, though unlike *T. canadensis*, this species is dioecious; these are now 20 inches high by 22 inches across, and 12 inches high by 15 inches across, respectively. In the preceding year the Professor sent male and female plants to Kew, which are now in the new National Pinetum at Bedgebury, in Kent. I cannot miss the chance of congratulating Kew and all plant lovers on their now having a place unfouled by London smoke, where there is every prospect of Conifers thriving. *T. brevifolia* is usually a smaller and slimmer tree than ours, though it has been known in its habitat to reach nearly 80 feet in height. The leaves, too, are shorter and thinner, and end in a bristly point which botanists call a *muco*. It was introduced to Britain as far back as 1854, but the fact that it is still so rare needs no other explanation than its want of distinction from ours. The truth is that all Yews are very much alike, both from the ordinary tree lover's (such as I am) standpoint and from the botanist's, and I should never be surprised to learn that men of science had decided to treat them all as geographical variants of one species. When I wrote the above sentence I had not looked up my "Trees of Great Britain and Ireland," by ELWES and HENRY, and was quite unconscious of the fact that the bold step had been taken already there of depriving *T. cuspidata*, *T. canadensis*, and *T. brevifolia* of their usual specific honours, and treating them as mere varieties of *T. baccata*; so I leave my opinion to stand as I wrote it, impudently suggesting that it illustrates the truth of the French proverb "Les beaux esprits se rencontrent."

*T. canadensis* (Marshall).—This species has the merit, not shared by ours, of being monoecious; far from making a tree, it is an almost prostrate bush, seldom rising beyond 4 to 6 feet above ground, and is otherwise distinguishable from our Yew by the shape of its leaf-

buds and its more abruptly pointed leaves; but, to my thinking, it is much more like *T. baccata* than *T. b. adpressa*, or than several other recognized variants of the English plant, such as, say, *T. b. ericoides*. I have but a little shrub, 2 feet high, of the Canadian type, which, so far, has not much to recommend it from an ornamental standpoint; but Professor SARGENT tells me that it is a nice plant to grow in shade, and that I do not do it justice. Doubtless he is right, but in VERTCH's book the same rather depreciatory tone about its ornamental value is expressed as I have ventured to adopt. True or not, it is this idea that has prevented its becoming common, for it is quite hardy, and was introduced at the beginning of the last century.

So far as varieties are concerned, I have *T. c. aurea* (Hort.), of which the name should serve as sufficient description. This plant is 3 feet 9 inches high by 4 feet across, and is about 16 years old; it is one of those Yews in which the chequered colouring is lost to sight in winter. Kew has two fine old plants, both of the type and the golden variety, the former being 7 feet high with a circumference of 36 feet, and the latter even bigger, being 9 feet high (an unusual height for this species) with a circumference of 51 feet.

*T. canadensis Washingtonii* (Hort.).—The plant which I described when dealing with Taxads in "Irish Gardening" in 1920 died, much to my regret, and my sole specimen is now only a baby, 4 years old and 8 inches in height. I gravely doubt whether this variety has anything to do with Canada, and suspect it of being merely one of the multitudinous *baccata* forms, but as I am no botanist and know nothing of the plant's origin or history my opinion is of small value, though Mr. HATFIELD, the above-mentioned American expert, confirms it. The variety has a golden hue, and is inclined to be of rather upright growth, according to the observations I made of my old plant, but it is described by BEAN, a much better authority than I, as "low and spreading, with leaves up to 1½ inches long," whilst Mr. OSBORNE of Kew writes to me that it is "of luxuriant growth, semi-spreading, with a tinge of yellow." Most of us are too prone to draw general conclusions from particular instances, and to assume because a single plant thrives, or dies, or grows high or low, that all others of the name can be counted on to behave in the same way. The Kew specimen was obtained in 1876, and is now 12 feet high and 69 feet in circumference; it must be at least 50 years old.

*Taxus cuspidata* (Sieb. and Zucc.), the "Japanese Yew," was originally introduced by FORTUNE about the middle of last century, but plants of that age are very rare in this country, and the oldest of mine are only about 18 years of age, and are due for the most part to the kindness of Professor SARGENT. All look extremely healthy, and this tree seems to be one of the few things which thrive equally well in the Eastern States of North America and in Britain. Unlike our Yew, this has proved quite hardy at the Arnold Arboretum, in the neighbourhood of Boston, Mass. Some may think it curious that this Yew, if it be only a variety of *T. baccata*, as ELWES and HENRY

consider, should be so much hardier. Yet, from my own experience, I can give even a more striking instance of similar kind, drawn from another genus. During the last 40 years I have frequently planted *Eucalyptus Gunnii* at Aldenham, but have never succeeded in keeping it alive through a really hard winter, yet *E. G. whittinghamensis* during the same period has survived entirely uninjured! Nevertheless, Mr. J. H. MAIDEN of Sydney, New South Wales, the well-known expert on the genus, whose recent death his many friends, and all botanists, deplore, assured me that he could find no botanical difference whatever between the two.

My best plant of *T. cuspidata* is 4 feet 6 inches tall, and has a circumference of 2 feet 3 inches, whilst that at Kew is 17 feet high, and as much as 60 feet in circumference. No record has been kept of its age, or whence it was obtained, which is much to be regretted. I do not think that anyone with an eye for plant-life would confuse most plants of this Yew (*T. cuspidata*) with ours, and yet, beyond the fact that the leaves have a yellowish tone on the underside, it is very difficult to record on paper any markedly distinguishing feature. BEAN, however, mentions that the winter buds are longer and have more pointed scales. In its native Japan *T. cuspidata* bears heavy crops of berries, and WILSON writes, "many trees presented a wonderful sight with their wealth of scarlet fruits."

*T. cusp. aurescens* (Rehder) and *T. cusp. contorta* (Hort.) are two varieties, grown neither by Kew nor me, of which the names furnish sufficient description; the former of the two may possibly be the same thing which I grow as *T. cusp. variegata*.

*T. cusp. densa* (Rehder) is a truly dwarf form which the one next below, though called "nana," is not. It is very rare in Europe and is not grown either at Kew or Aldenham, but HORNIBROOK has young plants given him by Professor SARGENT, who obtained it originally years ago from a nurseryman on Long Island. He is believed to have imported it direct from Japan, though the explorer WILSON did not come across it when visiting that country. It forms a compact round-topped mass which is well figured in HORNIBROOK'S "Dwarf Conifers." If only it were obtainable it would prove a valuable acquisition for our rock gardens.

BEAN records only one variety, which he calls *compacta*, which my good friend Professor SARGENT states should be more correctly known by an older name, viz. *T. c. nana* (Rehder), which Kew adopts in the new Hand List. This, as its name imports, is a cobby, close, rather slow-growing shrub, suitable for a large rockery. I acquired this form, which is the more common and popular in the United States, and said to be the more readily propagated from cuttings, at the same time as the type, in or about 1908. ELWES, writing two years earlier, states that he had never seen a specimen. My friend Mr. HATFIELD, mentioned earlier in this paper, describes three or four distinct forms of *T. cuspidata* which are grown at Wellesley, and of which they have fine examples. He writes: "There is (1) the tree



form, which I presume to be the type, conical like a spruce tree; (2) the columnar-vasiform, branching from a short stem, of which we have a specimen 16 feet by 10 feet; (3) the bowl-shaped, hollow-centered, with the tips of the branches recurved—of these we have specimens 25 feet by 8 feet; (4) another form, with a stem 6 to 8 feet high, branching horizontally." It seems manifest that, if *T. cuspidata* had been established here some 200 years instead of 20, our ingenious nurserymen by now would have developed and christened nearly as many fancy varieties as they have of *T. baccata*. Mercifully, that is a matter which will concern some yet unborn writer, and not me. Kew has several old plants which were formerly labelled *T. cuspidata* but are in fact the var. *nana*.

I have had plants under the name *T. cuspidata capitata* coming, I think, from America, but Professor SARGENT has explained that "*capitata*" is used by nurserymen there to describe the type or free form of *T. cuspidata*. I have therefore ceased to use it, and all the more willingly as it seems a foolish one, for its meaning, "forming a head," can convey little to distinguish one type from another.

*T. cuspidata fructu luteo*.—This is another variety I have, which has borne two or three fruits, enough at any rate to prove a justification for its name; though even before it fruited I had no doubt of its correctness, for in the yellow colour of the wood and of the spring buds it shows just the same difference from the type as is the case with the yellow-fruited form of *T. baccata*. This is a very rare variety in cultivation here, indeed one or two of my gardening friends have expressed scepticism as to its existence.

*T. cuspidata sinensis* (or *chinensis*) (Rehder and Wilson).—See *T. sinensis* (Rehder).

*T. cuspidata Sieboldii*.—This is an interesting and handsome form, of which both the origin and correct name are doubtful; it was obtained by Mr. HATFIELD, gardener at Wellesley, Mass., from WATERER'S nursery, where it was stated to be of Chinese (? *rectius* Japanese) origin, a statement unlikely to be correct, for the only Chinese form of Yew found or recognized by the explorer WILSON is the one now called *T. sinensis*, a very different thing.

At Wellesley it has thriven well, and in 1921 measured 5 feet in height and 8 feet in diameter. I cannot do better than quote Mr. HATFIELD'S account of it: "A free-grower, broadly vasiform; the habit is dense and the leaves are shorter and twigs thinner than the type; in colour it is olive. It comes true from seed, so far as colour and general character go, but many of the seedlings develop a leader, which the original does not." The Aldenham plant, sent as a rooted cutting from Wellesley in December 1921, is now 1 foot 3 inches high by 10 inches in diameter, and quite healthy. This variety is not grown at Kew, though it appears in the new Hand List as a variety of *T. baccata*. This may be right, for some forms of *cuspidata* are so close to our own *baccata* that they are indistinguishable; but I do not think so, and against it being a form of *baccata* is the fact that

it flourishes exceedingly in Massachusetts, whereas all other known forms of *baccata* are gradually winter-killed there.

I have, too, *T. cuspidata*, which, as its name implies its characteristics, needs no further description, other than to note that my plant, curiously enough, has taken on a freakish growth, not having been faked in any way; it is 2 feet 6 inches high, 3 feet long, but only 1 foot 2 inches wide. It grows in a wavy curve, terminating in a sharp point at both ends, and at a little distance looks like some strange bird of the nature of a pheasant. This variety is not grown at Kew.

*T. floridana* (Chapman) is said to be confined for its habitat to Western Florida. It is not grown at Kew or Aldenham, and I have never seen it, nor heard of its introduction; very possibly it would not prove hardy if brought here. I can give no first-hand information, but in VEITCH'S "Manual of Coniferae" it is described as "a bushy tree, rarely 25 feet high, with numerous short, spreading branches . . . except in habit not easily distinguished from *T. canadensis*," of which I should imagine it to be an unimportant variant.

*T. × Hunnewelliana* (Sargent) is a recently produced hybrid (*canadensis* × *cuspidata*) which originated at Wellesley, Mass. It is not growing either at Aldenham or Kew, and I cannot describe it, but Mr. HATFIELD has kindly promised me a plant.

*T. × media* (Rehder) is a little known hybrid (*baccata* × *cuspidata*) which I do not possess, but which is growing at Kew, having been bought from SPÄTH of Berlin in 1919. It is now 3 feet high, and has a circumference of 17 feet.

*T. sinensis* (Rehder).—The plant WILSON sent home in seed, in which form the genus is represented in China and Formosa, and which he called *T. cuspidata chinensis*, has recently been given specific honours by REHDER, and figures as *T. sinensis*, Kew having adopted this view. I do so too, and to the non-botanist it seems a very natural course to take, for the general appearance is very distinct from the type and known varieties of *T. cuspidata*, being sparsely furnished, and having a light open growth and long leaves. Indeed, to my eyes, which are not those of a botanist, and only judge from the superficial appearance, it looks almost as much like a *Cephalotaxus* as a true Yew. My best plant is 5 feet 1 inch high, with a diameter of 3 feet 6 inches. Curiously enough, Kew appears to have omitted to acquire this distinct species until I had the privilege of giving rooted cuttings in 1922, though I think a good many plants have been raised in this country from seed sent over by WILSON. A plant has been grown at Kew since 1876 under the name *T. baccata sinensis*, which the inspection of the new Hand List shows to be regarded as a synonymous name of the above, and the plant itself is nothing more than a short-leaved form of our common Yew. No one in his senses could give such an account of the plant which WILSON introduced, nor do I believe that the *T. sinensis* was in existence in Europe at that date. There can have been no justification for giving a varietal name suggest-

ing Chinese origin to what is only one of the thousand varieties of *baccata*, and the name is to be dropped.

*Cephalotaxus* (Sieb. and Zucc.) furnishes a small group of evergreen trees closely allied to, and outwardly resembling, the Yew, but the leaves of the former are materially larger, and not nearly so closely packed as in the latter genus. All species of *Cephalotaxus* are impervious to our winter cold, but if they are to thrive they should not be exposed to too much either of sun or wind. I spent an afternoon at Kew this year in careful examination of the fine collection of Taxads there, and I could not help being immensely struck by the contrast presented by the healthy indigenous Yews with the comparatively ill-furnished and weakly exotic relations, such as *Torreya*, *Cephalotaxus*, etc., planted in the vicinity. It is a true saying, though a discouraging one for collectors, that more pleasure is to be gained from looking at the commonest tree or shrub when in perfect health than the choicest rarest plant can give if it be living in a soil and climate where it is not completely at home.

*Cephalotaxus drupacea* (Sieb. and Zucc.) is known popularly as "Cow's Tail Pine." WILSON in "The Conifers and Taxads of Japan" (1916) states that this is the only one of the genus indigenous to Japan, and makes a shrub in the cold parts and a small tree in the warm ones of that empire. It was introduced either from China or Japan by SIEBOLD about 1829. My specimens are quite hardy and healthy, but have not yet attained more than 5 feet in height, with a spread of 2 feet. In England it does not appear ever to reach the dimensions of a tree, as it does in the south of Japan. The fruit is over an inch long by about  $\frac{3}{4}$  of an inch wide, and brown when ripe. The fine Kew plant is 11 feet 6 inches high, and has a circumference of 57 feet.

*C. d. fastigiata* (Pilger).—I have at least three fair-sized plants of this variety, the best being 5 feet 8 inches high and 3 feet wide. This is often classed as *C. pedunculata fastigiata*, and one botanist, for some reason best known to himself, called it *Taxus japonica*, though it is obviously not a *Taxus*, and, indeed, is much more like a *Torreya* than a Yew to look at, though to the touch it is very different, the leaves of *Torreya* being stiff and spiky, while of this genus they are soft and yielding. At Kew there is a plant 9 feet 6 inches high, with a circumference of 24 feet.

*C. d. nana* (Rehder).—Kew has a plant of this dwarf variety which I cannot boast of, 3 feet high and 9 feet round. It came from the Arnold Arboretum in 1919.

*C. d. pedunculata* (Miquel).—Of this far commoner shrub which used to have specific rank, but is now treated as a variety of *C. drupacea*, I have nothing bigger than 3 feet 9 inches in height and 2 feet 3 inches across. The plum-like fruit of this species, about 1 inch long, hangs from a short bent stalk. The Kew plant, bought in 1890, is now 11 feet high and has a circumference of 54 feet. There is also a trailing variety of this species with wide-spreading branches, viz. *C. d. p.*

*prostrata*, which I bought from Messrs. HILLIER of Winchester. It is 2 feet high by 4 feet across. It is not to be found at Kew.

*C. d. p. sphaeralis* (Masters).—This little-known variety is not to be found at Kew or Aldenham, but it is mentioned by VEITCH as having been growing at Steyning in Sussex; but I know nothing about it beyond what I have read in the "Manual of Coniferae," so must refer the zealous inquirer after knowledge to that excellent work.

I have another *Cephalotaxus*, kindly given me by Mr. GERALD LODER, who raised it from seed which had been sent him from China. In 1919 I submitted it to Kew to be named, with the result that it was pronounced to be *C. drupacea*. With all deference to the learned men who gave this verdict, I am bound to say that it appears to me to be distinct from the plant generally grown under that name, though I have no doubt that it is only a variety of it.

*C. d. sinensis* (Rehder) is one of WILSON's introductions, and is very rarely to be seen in European cultivation. It is bolder, more showy, and, I think, handsomer than the type. My largest plant is about 16 years old, and, though not a fast grower, is quite thriving. It measures 4 feet both in height and across. Kew has several plants received from the Arnold Arboretum in 1908.

*C. Fortunei* (Hooker).—Although an immigrant from North China of over seventy-five years standing, seed having been sent by Mr. FORTUNE to Bagshot in 1848, my largest plant is only 9 feet high and 5 feet across, and I doubt if there is one over 20 feet in height in the country, although it is said to reach 60 feet in China. The Kew plant, for instance, bought from VEITCH in 1880, and which must therefore be nearly, if not quite, 50 years old, is now only 12 feet 6 inches high, though it has the considerable circumference of 57 feet.

Kew has two varieties, which were obtained from ROVELLI's beautiful nursery on Lago Maggiore in 1888, namely *C. Fortunei brevifolia*, now 7 feet 6 inches high by 57 feet round, which, as its name implies, has shorter leaves than the type, and *C. F. longifolia*, which seems to be pretty well typical in leaf-length, 12 feet high with a circumference of 42 feet. Two other varieties are mentioned in the Kew Hand List, *C. F. grandis*, a female form, with very large leaves and exceptionally arched stems, which was obtained by Kew from HILLIER of Winchester in 1923, and Aldenham has recently acquired a plant from the same source, now 2 feet 6 inches high and 4 feet in diameter, and *C. F. robusta* (Lavallée), which is not grown at Kew or Aldenham, and of which I know nothing.

*C. Oliveri* (Masters) does not appear in the Kew Hand List, and there has never been, so far as I know, more than one plant in European cultivation, although WILSON describes it as "common in Western Hupeh and Szechuan." That was introduced by the famous firm of VEITCH, and used frequently to appear amongst their show plants at R.H.S. Exhibitions. They never succeeded in propagating it, and it ultimately died—a sad loss. BEAN tells me he remembers

it perfectly well as a "very distinct and really striking species." He used to covet it, in vain, for Kew.

*Ginkgo biloba* (Linnæus).—This is quite unlike any other of the Taxaceae, or indeed any other living tree whatever, being monotypic. It is a strange survival of a long past era, when enormous lizards on the ground and in the air took the place of mammals and birds familiar to us. It is but one species of many of which fossil remains are now the only evidence. It was for a very long period after its introduction to this country presumed not to be growing in the wild state, even in the most likely places of origin, China and (or) Corea, but in the preface to the second edition of the Kew Hand List of Coniferae, issued in 1903, it is stated that "several fine specimens have since been found by Mrs. BISHOP in the magnificent forests which surround the source of the Great Gold River and the smaller Min, in Western China, and also in the forests of Central Yesso, Japan" (*Journ. Linn. Soc. Bot.* xxvi. 547). The explorer WILSON, however, remains sceptical as to the existence of the tree in a wild state, and it seems highly desirable that Mrs. BISHOP's statement should be confirmed. Its preservation otherwise in cultivation is due to the fact that it is regarded as sacred by both Chinese and Japanese, who have used it for centuries to decorate the precincts of their temples. The name *Ginkgo* is a corruption by KÆMPFER (the first white man to see and describe it) of a Chinese word meaning Silver Nut. A later, and now little used, synonym is *Salisburia adiantifolia*, and here the specific name is happily chosen, calling attention, as it does, to the intrinsic likeness of its foliage to the *Adiantum* and thus leading to its bearing the popular name of "Maiden-hair Tree." Indeed, such affinity as it can claim to living plants is to the Conifer and the *Cycas*, an ancient type of Fern, and it may be viewed as a link between them. Any link that once existed between the Conifers and broad-leaved trees is lost, and so far as I know it is impossible to say that any one type of Conifer approaches nearer than another to such trees as Oaks and Elms. Though the *Ginkgo* may bear a slight likeness to some of the broad-leaved trees, such as the Tulip Tree, it is in no way related to them, for what appear to be its leaves are not leaves at all, in the sense that they have no regular construction, with midrib, lateral nerves, etc., such as are borne by all broad-leaved plants, but they are, in truth, only pine-like needles webbed together as a duck's foot is. KÆMPFER first saw it in 1690, but it is believed not to have reached England till a little over sixty years later. The tree is dioecious, and the male was introduced long before the female, which latter was brought here by the agency of the botanist DE CANDOLLE in or about 1814. As a general rule, little trouble has been taken in English gardens to secure the fruit, either by growing both sexes in proximity or by grafting a branch of one sex on a tree of another. Consequently, though I have frequently seen such in the neighbourhood of the Italian Lakes, I have never seen an English tree, except the one at Kew, that has borne nuts. I am ashamed to confess that I am a sinner in this respect

myself, and the three fair-sized Ginkgos at Aldenham are confirmed bachelors! I may perhaps urge in my defence that the female plant is difficult to obtain, though three female trees are known to be in England: (1) in a garden in Bath; (2) at Mrs. PORTER'S, Blakes, Lymington; (3) at Denham Rectory, Bucks. A friend of mine, a few years back, went to some trouble and expense to import a consignment of the fruit with a view to raising females from seed: his useful scheme was frustrated by our intelligent Custom House officials, who impounded the package and notified him that the contents had been destroyed, being "unfit for human food"! The nuts are indeed said to be eaten by the Japanese, but the offensive smell of their fleshy covering does not encourage experiments by white men in that direction. The tree grows tall, and has been known in the Far East to reach 100 feet in height. At Aldenham there is nothing remarkable in age or size; the stoutest in girth measures 24 inches, and the tallest in height 25 feet—they are both under forty years of age. Nearly all the trees which I have noticed in England have short boughs and are of more or less fastigiate habit, whereas in North Italy I have observed them to be of a different type, with long sweeping branches, growing at right angles to the trunk, or sub-pendulous, and producing, to my thinking, a far more luxuriant and picturesque effect. One of the greatest merits of the Ginkgo, from the ornamental standpoint, is the glowing golden colour which the leaves take on in the fall.

Just as I had completed this sadly long-winded article I became aware of the fact that botanists recently have decided to remove the Ginkgo from the Taxaceae, and place it in solitary grandeur in an order of its own, the *Ginkgoaceae*, which seems to me, who am no botanist, a sensible course to adopt, seeing that the Ginkgo antedates by millions of years such comparatively commonplace newcomers as the Yews, who in their turn are older by countless æons than the broad-leaved genera. And yet, as a boy, I was carefully taught that the world was created 4004 B.C., a date when in fact Egypt was at the top of its civilization! The terminal "4" produces a pleasing effect of precision. Certainly we know better than that now, though none of us know much. I could not bring myself to "scrap" what I had written on the Ginkgo, not because I fancied it to have any special merit, but because it gives me an opportunity of recording the measurements, up to date, of the splendid specimen at Kew, which nearly every tree lover knows and admires, and which is one of the greatest glories of our National Collection. Its height is 75 feet, its girth 10 feet 11 inches; planted originally against a wall about 1760, and therefore about 170 years old. It is a male tree on which a female branch has been grafted, which has several times borne fruit.

There are four recognized varieties of *Ginkgo biloba*, viz. *G. b. fastigiata* (Hort.), *G. b. laciniata* (Carrière), *G. b. pendula* (Carrière), and *G. b. variegata* (Carrière), of which I have only the first and third at Aldenham. This weeping variety with me measures 8 feet in height, and is planted over a rock by a tiny waterfall, and should look very

attractive when it has made more growth, the diameter of the spread of the branches being 6 feet.

*Phyllocladus* (L. C. Richard).—Five species of this genus are known, one from Borneo, three from New Zealand, and one from Tasmania, of which the last, *P. rhomboidalis* (L. C. Richard) or, as it is popularly called, the "Adventure Bay Pine" or "Celery-topped Pine," is the only one with any pretensions to be hardy, and this will thrive only in the warmest parts of England. This and two New Zealand members of the family can be seen in the Temperate House at Kew. It is no part of my plan to give any detailed account of plants that are too tender to be other than strangers to the open air at both Kew and Aldenham. Lord CLINTON owns a magnificent specimen of *P. rhomboidalis* at Bicton, near Exeter, and I must have seen another when I enjoyed the hospitality of Sir JOHN ROSS-OF-BLADENSBURG, at Rostrevor, in the Morne Mountains, though I cannot now recall its dimensions. For other species of *Phyllocladus*, not cultivated in England owing to their tenderness, see VEITCH'S "Manual of Coniferae."

*Podocarpus* (L'Héritier).—The various members of this genus are interesting Taxads, but, unfortunately, some of them will not stand the combination of heavy clay soil and hard winters which we have to endure in Hertfordshire.

*Podocarpus alpina* (R. Brown).—Hailing from Tasmania and the Victorian Mountains, this has, in spite of its place of origin, proved quite hardy at Kew for over 30 years. It is a slow grower, and never makes more than a low evergreen shrub. My best plant is not 3 feet high, and those at Kew, though so much older, are but half a foot higher, though much bigger in circumference, which reaches 18 feet. With its tiny narrow leaves, growing in whorls, it has very much the outward aspect of a *Saxegothaea*. There is a good plant also to be seen growing on a rockery at Sparrow's Herne Hall, Bushey (near to Aldenham).

*Podocarpus chilina* (L. C. Richard).—This survived with me, after a fashion, for many years, but finally succumbed. It is an evergreen tree, brought to this country from the Chilean Andes in 1853, and in the few places where it is seen, in the S.W. of England, it makes a striking feature. I have now only quite young specimens of any of this family. The fact that at Kew they have a plant of this species over 30 years old, 9 feet high and 36 feet in circumference, makes the prospect of ultimate success at Aldenham hopeful.

*Podocarpus macrophylla* (Don).—This Chinese and Japanese species has only been included in my collection since January 1920, and with me has proved a slow grower. Though said to be "fairly hardy in the South of England," at Kew it is only grown in the Temperate House, but judging from Aldenham experience I think it might fairly be tried in the open air. My plant is a foot high and in spread. In its own habitat it is used for clipping into fanciful shapes, as we sometimes see the box and yew employed, though, as I have stated earlier in these notes, shrubs clipped in the shape of birds and

beasts do not appeal to me, and, unless in a purely formal garden, amount, in my eyes, to an actual disfigurement. E. H. WILSON, in "The Conifers and Taxads of Japan," describes the trees, as he saw them growing wild in the Osumi province of Japan, as decidedly sombre in aspect with their very numerous branches, fruit greenish or purplish about the size of a pea, yellow-brown wood which is very durable in water, but, owing to its rarity, of no recognized market value. A variety, *P. m. Maki* (Siebold), was brought to Europe in 1800, and to the Woburn Pinetum about 1830, but this has disappeared, and I do not know that it is now in England.

*Podocarpus Nagi* (Makino).—This, which WILSON saw only in cultivation in Japan, is called by him "one of the most strikingly beautiful of all evergreen trees," but it is not so hardy as *P. macrophylla*, and would only thrive in the warmest parts of England; it is grown in the Temperate House at Kew.

*Podocarpus nivalis* (Hooker f.).—Next on the list comes this, but I can find no account of it in any of my gardening books, so I presume this is on account of its tenderness. Kew grows it in the Temperate House and also for several years out of doors. It is one of the very short and small leaved kinds, and, externally, has much in common with *Prumnopitys elegans*. It has been too short a time here to enable me to pronounce on its hardiness, but the fact that it also is a native of New Zealand makes its survival through many Aldenham winters an improbability. My specimen is of the same height and age as its last-mentioned relative. It was given me in 1918 by that ready giver GERALD LODER, and the one at Kew, in all respects a twin, came there in the same year from the same source. That mine should have lived six years and successfully withstood a fall of the glass to zero in mid-January last is encouraging, though the weather then was extremely dry and the great cold of very short duration.

*Podocarpus nubigena* (Lindley).—This, another Chilian species, with much longer, stiff, spiky leaves, standing out conspicuously nearly at right angles to the branches, has, to my mind, some resemblance to a *Torreya*. Though I have one or two small plants of this, at the time of writing, about 18 inches high, and dating their existence at Aldenham from April 1920, yet I gather from Mr. BEAN'S book that, owing to our climate being far removed from that of favoured localities in Cornwall and Ireland, not many winters will elapse before they have joined my *P. chilina* in the tomb. The finest specimens existing in these isles are said to be those at Kilmacurragh, Co. Wicklow. It is grown in the Temperate House at Kew. So far, at any rate, it has lived at Aldenham for six years, without any special protection.

*Podocarpus Totara* (A. Cunningham).—A New Zealander, with leaves larger than *P. alpina*, but smaller than *P. nubigena*, which last it much more nearly resembles. The leaves, however, instead of standing out separately from the twigs as in *nubigena*, grow in bunches, with a bottle-brush formation. I should say its hardiness with me is likely to be very doubtful, for at Kew it is grown only



in the Temperate House, though in its own habitat it makes one of the finest and most valuable timber trees. My plant is still quite young, and, like *P. macrophylla*, only 1 foot high.

There are various other species of *Podocarpus*, apparently not hardy in this country, so they are not dealt with here; particulars are to be found in VEITCH'S "Manual of Coniferae." Of these, *P. acutifolia* (T. Kirk) from New Zealand, *P. dacrydioides* (Richard) from the same, *P. elongata* (L'Héritier) from W. S. Africa, *P. falcata* (R. Brown) from S. Africa, *P. ferruginea* (D. Don), New Zealand, *P. gracilior* (Pilger) from Uganda, etc., *P. imbricata* (Blume), Borneo, etc., *P. Milanjiana* (Rendle), Cent. and E. Africa, *P. montana* (Loddiges), Peru, etc., *P. neriifolia* (D. Don), Himalaya, and *P. spicata* (R. Brown) from New Zealand, are all to be seen in the Temperate House at Kew.

*Prumnopitys elegans* (Philippi).—The "Plum-fruited Yew" is an evergreen taxaceous tree, reaching some 50 feet in Chile, but under English cultivation, to which it was first introduced in 1850, it is never more than a big shrub. It has proved quite hardy at Aldenham, even in very severe winters, when isolated as a lawn specimen. My best plant is a rounded bush, 10 feet tall, with a spread of branches amounting to 54 feet round (fig. 54), but there is a considerably taller one at Tortworth, Glos, and another very fine one in a garden at Ryde, Isle of Wight. I saw both of these in fruit, and remarkable it was, being in size and colour like a fine Muscat grape, but more sharply pointed at the apex. It is very near to *Podocarpus* both botanically and to look at. The largest of the four fine Kew specimens has a height of 24 feet and a circumference of 66 feet. No other species of *Prumnopitys* is known.

*Saxegothaea conspicua* (Lindley), introduced from Chile by LOBB in 1847, makes an interesting small, yew-like tree in places where it succeeds, but, alas! I have to confess that Aldenham is not one of them. I lost the first plants which I acquired, possibly from winter cold or other causes, and the few that now remain are unhealthy, losing branches here and there from no explicable cause. In the spring of 1920 they turned over a new leaf and seemed for a time to be doing well, but soon went wrong again, and though I do not believe that this species is really tender, I have now, after about fifteen years' trial, abandoned hope of making a success of it at Aldenham. The leaves are small and the branches pendulous. Its name was given in compliment to our Prince Consort. No other species of this genus has yet been discovered. The Kew plant is fairly healthy, but not over vigorous, and has proved there a very slow grower. No record has been preserved of when it was acquired, but it has been there many years, and is now only 6 feet high, with a circumference of 18 feet.

*Torreya* (Arnott) is an evergreen, yew-like genus, with bigger, stiffer, more shiny leaves than *Cephalotaxus*, getting its name from the American botanist, Dr. JOHN TORREY. In the United States, where any chance of establishing a different nomenclature from that prevailing at Kew is eagerly grasped, it is now called "Tumion," and the popular

name there is "Fetid Yew," owing to the smell given off by the young leaves when crushed. They are often said not to thrive in Great Britain, and it is true that I have lost all mine except the comparatively common one, but fine specimens are to be found in other parts of the country.

*Torreya californica* (Torrey) or, as it is used generally to be called, *T. myristica*, is known in the States as the "Californian Nutmeg," of which the habitat ranges from British Columbia to California, and has so far not been damaged materially by frost at Aldenham. The foliage is dark green in colour, stout and stiff in texture, and terminates with a sharp point. BEAN records an example 45 feet high at Tregothnan in Cornwall, and I know of another one, which falls short of this height by 8 feet, at Westonbirt, and yet another, which has a fine spread of nearly 40 feet, at the aforementioned Tortworth. It was introduced to England in 1851 by WILLIAM LOBB. For its perfect development it requires a heavy rainfall, and should therefore thrive better in the West than in the East Counties. My old friend EDMUND HANBURY had a fine specimen at Poles, in Herts; I have not seen it since his death, but it should by now be about 45 feet high and 70 years old. My best is on a short standard, branching at above 4 feet above ground; its height is 13 feet and its spread 9 feet across. I cannot say that Aldenham has done well with the genus, I presume because of the climate being too dry for them. At one time I had all four species of this small family, but now the three rare ones are all dead. I have never seen the plum-like fruits myself, but they have been produced in this country. The biggest plant at Kew, 22 feet in height and 42 feet in circumference, though not one of the largest in the country, is by no means to be sneezed at.

*Torreya grandis* (Fortune).—Introduced in 1855 from China by FORTUNE. The leaves are slighter and thinner in texture than is the case with the Californian form, and, according to the example I had at any rate, of much lighter green. This last feature, however, may easily have been attributable to want of vigour, and, indeed, I did not have this species long enough to write with any confidence as to its behaviour. It reaches 80 feet in its own habitat, but is very rare in cultivation here, nor are any big specimens recorded by ELWES and HENRY as growing in our islands. The best plant at Kew is 15 feet high and 16 feet through.

*Torreya nucifera* (Sieb. and Zucc.).—The Japanese species, whose habitat is Japan and Quelpaert Island, south of Korea, is closely allied to the last mentioned. It is certainly far rarer in English gardens than *T. californica*, although Professor SARGENT bestows high praise on the "extraordinary beauty" of its appearance in its native land. In its own country it attains to more than 80 feet, and when full grown has an attractive bright-red bark. Though first introduced so far back as 1768, it has remained very uncommon here, and, so far as I can learn, has never attained the dignity of a tree. It is plentiful in Japan, quite hardy even in Massachusetts,

and WILSON calls it "strikingly beautiful," so it seems a great pity that it should be almost unknown in England. As already mentioned, the plant which I had growing in 1920 is dead, but GERALD LODER, always ready to help a friend, has filled up the gap with a rooted cutting from Wakehurst. The fine specimen at Kew is 14 feet high and has a circumference of 40 feet. Unfortunately no record has been preserved of its age or origin. Judging from this, there seems no reason why I should not succeed in establishing it at Aldenham.

*Torreya taxifolia* (Arnott), the "Stinking Cedar" of Florida, is only to be found, so far as I know, in two gardens in these islands, viz. Endsleigh, Devon (the Duke of BEDFORD'S), and Leonardslee, Sussex, the plant which was kindly given me by Professor SARGENT in 1920, and which he believed to be not in European cultivation at the time, having unfortunately died. It has smaller leaves than those of *T. californica*. It is not grown at Kew, and is even omitted from the Hand List, and unless the same kind giver can and will repeat his donation, I do not know how I am to replace it.

Here ends my account of the Taxads at Kew and Aldenham, and I fear that I may have taken up more of your space, Mr. Editor, than the subject really warrants; but though they may not be the most interesting or ornamental of genera, they are certainly not devoid of merit, and are worthy of more attention than they commonly receive. Anyone who tries, as I have done, to give an account of his Yews generally, and particularly of the *baccata* varieties, must feel uneasiness as to whether his plants are true to name, and whether, when he has drawn a careful and elaborate portrait of, say, *T. b. epacroides*, the plant which has sat for it is a different one, say *T. b. ericoides*, which may have been supplied by a nurseryman better intentioned than informed. Years may, and probably will, elapse before such an error is discovered, for not only are all the varieties, except always *T. b. adpressa*, very much alike, but very few visitors, keen tree lovers though they may be, take warm interest in or have minute acquaintance with Taxaceae. The nomenclature is in great confusion, especially of the dwarfier sorts, e.g. three distinct *baccata* varieties have all been called *nana*; again, there is a species *brevifolia* from California, a variety of our Yew, and a variety of the Japanese, both also called *brevifolia*, and, to make things worse, these three species, and indeed *T. canadensis*, are all so much alike that several good botanists think they ought to be amalgamated! It will be seen that the wretched man who has taken on my job must indeed gang warily, or he will be found to have done more harm than good, and to have made "confusion worse confounded."

Should anyone feeling doubts as to his plant's identity turn up some of the plenteous authorities, he will, as a rule, find cold comfort. Take the two varieties above mentioned, *epacroides* and *ericoides*: very few books give both, most give a description so vague that it will do equally well for one or the other, and one good authority falsely alleges that there is no difference between them. I know full

well how excessively difficult it is for a man not a botanist to describe these Yews so that they can be easily distinguished and identified, and even if I had been a botanist I should have probably written in such learned language that this paper would have been of little use to 90 per cent. of the people who might want to read it. Now, as I have grumbled, let me also praise, and invite your readers to admire the intelligible, precise and elaborate word-picture which my friend, Mr. M. HORNIBROOK, has drawn of *T. b. nutans*, which I have ventured to transfer *en bloc* to this paper. If some critic should find me guilty of disseminating error, I can only plead in extenuation that there has been no want of care or pains, though there may well have been insufficient competence for so arduous a task. The two who have rendered me most help are Mr. HORNIBROOK and, as is always the case whenever I venture into print, Mr. W. J. BEAN. My warm thanks are due to them, and also to Mr. A. OSBORN, who has been at great pains to furnish me with details of the Kew plants, and to Mr. A. B. JACKSON, who has read my proofs and given useful suggestions.

#### ADDENDA.

*T. baccata aurea* "Wm. Barron."—A golden variety of pyramidal habit which I have not had long enough to form a very clear opinion of. It is 4 feet 6 inches high and 1 foot 9 inches through.

*T. b. buxtonensis* is an attractive pendulous form, quite distinct from *horizontalis*, *gracilis pendula*, etc., which I have quite recently bought from Messrs. BARRON. It is 2 feet 3 inches high and 4 feet in spread. It has a flat top.

*T. b. elvactonensis aurea* is another of many golden forms which I have acquired so recently from Messrs. BARRON that I am not in a position to describe its special features. It is 2 feet tall by 1 foot 9 inches across. Neither this nor the preceding is grown at Kew.



FIG. 55.—HAZEL—A WIND-POLLINATED FLOWER.  
A, the pistillate ; B, the staminate flowers.

[To face p. 224.]



FIG. 56 —PEAR.  
An insect-pollinated flower

## CONTRIBUTIONS FROM THE WISLEY LABORATORY.

## XLVII.—POLLINATION IN ORCHARDS (VII.).

*Insect Visitors to Fruit Blossoms.*

By G. FOX WILSON, N.D.H., F.E.S., Entomologist.

THE important part that insects play in the pollination of fruit trees (except nuts and mulberries) has long been recognized, but while lists of insect visitors to fruit flowers have been made, observations on their habits have been few and scanty. The usefulness of the hive bee as a pollinating agent is indisputable, but observations made at Wisley and elsewhere show that the work of transferring pollen from flower to flower is by no means confined to this insect. The pollination of the flowers is effected by many other species, whose presence, however, cannot be ensured with the same ease as those of domesticated bees.

In order to appreciate the work that insects perform in pollination, it is well to understand the principles underlying the relationships between them and flowers. The essential organs of a flower are the stamens and the pistil, which in all the plants under consideration in this paper, with the exception of those that are wind-pollinated, are borne in the same flower. The stamens, which represent the male reproductive organs, consist of two parts: the stalk or filament, and the anthers which contain the pollen grains. The female reproductive organs are represented by the pistil, and are composed of three parts: the terminal viscid portion or stigma, the middle portion or style, and the basal ovary containing the ovules. When the anthers are ripe, they dehisce and shed their pollen, which, in fruits belonging to the rose family, resembles finely-ground sulphur. In the apple, pear, plum, and cherry, the pollen is in separate granules, whilst the grains of currant and gooseberry flowers are stuck together in glutinous masses. Pollen grains generally need to be carried by wind or insects, and their goal is the receptive stigma on which they germinate and send out a long tube, which makes its way down the style to reach the ovules, which are fertilized. To ensure fertilization of the ovules, it is generally necessary that the pollen and stigma shall be of the same species of plant—for instance, the pollen of pear will not fertilize the plum or any other fruit flower but pear.

The flowers of our hardy fruits are of two kinds: anemophilous, or wind-pollinated, and entomophilous, or insect-pollinated. That there

are marked differences between these two groups may be seen by comparing the flowers of hazel and pear :

A typical anemophilous flower—  
Hazel (fig. 55)—has:

Obscure colour.

Male organs in pendulous catkins ;  
female, small and inconspicuous.

Pollen — abundant, light, dry,  
smooth, sometimes winged.

Scent—absent.

Nectar—absent.

Flowers well before the leaves  
appear.

A typical entomophilous flower—  
Pear (fig. 56)—has:

Floral envelope coloured, attrac-  
tive and protective.

Male and female organs in the  
same flower (hermaphrodite).

Pollen—less abundant, heavier,  
sometimes glutinous.

Scent—present.

Nectar—present.

In the following table (Table I.) our hardy fruits are arranged in two groups: insect- and wind-pollinated. The last column shows whether they are generally self-fertile or self-sterile. Other columns show the number of species of insects of various orders recorded by MÜLLER,\* KNUTH,† and the author on the various flowers.

TABLE I.

		Insect Visitors.									General Notes.
		Hymenoptera.	Diptera.	Coleoptera.	Lepidoptera.	Neuroptera.	Rhynchoptera.	Thysanoptera.	Orthoptera.	Arachnids.	
A. INSECT-POLLINATED FLOWERS.											
Apple											{ A few varieties are self-fertile. Most vars. are more or less self-sterile.
	Müller	. 10	6	—	—	—	—	—	—	—	
	Knuth	. 1	2	—	—	—	—	—	—	—	
	Wisley	. 27	42	22	6	2	3	2	—	3	
Pear											{ Few vars. self-fertile. Most vars. are more or less self-sterile.
	Müller	. 10	16	4	—	—	—	1	—	—	
	Wisley	. 16	24	9	—	—	—	2	—	3	
Quince											
	Wisley	. 9	7	6	1	—	—	—	—	—	Self-fertile.
Medlar											
	Wisley	. 2	1	—	—	—	—	—	—	—	Self-fertile.
Cherry											{ Sweet vars. are mostly self-sterile. Some vars. are intersterile. Morcellos are self-fertile.
	Müller	. 8	3	—	3	—	—	—	—	—	
	Knuth	. 1	—	—	—	—	—	—	—	—	
	Wisley	. 15	10	3	1	—	—	—	—	—	
Almond											
	Knuth	. 3	1	—	—	—	—	—	—	—	{ Self-fertile.
	Wisley	. 2	1	—	—	—	—	—	—	—	
Apricot											
	Müller	. 6	—	—	—	—	—	—	—	—	{ Self-fertile.
	Wisley	. 2	—	—	—	—	—	—	—	—	

\* MÜLLER, H., *The Fertilization of Flowers*, 1883.

† KNUTH, P., *Handbook of Flower Pollination*, 1906.



TABLE I. (*continued*).

		Insect Visitors.									General Notes.
		Hymenoptera.	Diptera.	Coleoptera.	Lepidoptera.	Neuroptera.	Rhynchota.	Thysanoptera.	Orthoptera.	Arachnida.	
A. INSECT-POLLINATED FLOWERS (continued).											
Peach and Nectarine											Self-fertile.
Müller	.	4	—	1	—	—	—	—	—	—	
Knuth	.	3	—	—	—	—	—	—	—	—	
Wisley	.	3	2	—	—	—	—	—	—	—	
Plum											Few vars. are self-fertile. Some are intersterile. Many are more or less self-sterile.
Müller	.	8	3	—	3	—	—	—	—	—	
Knuth	.	2	1	—	1	—	—	—	—	—	
Wisley	.	18	18	4	2	—	1	—	1	1	
Blackberry											Self-fertile.
Müller	.	36	13	15	4	—	—	—	—	—	
Knuth	.	6	5	—	4	—	—	—	—	—	
Wisley	.	9	13	3	1	—	—	—	1	—	
Raspberry											Self-fertile.
Müller	.	13	2	2	—	—	—	—	—	—	
Knuth	.	2	8	—	1	—	—	—	—	—	
Wisley	.	18	11	3	1	—	2	—	—	—	
Loganberry											Self-fertile.
Wisley	.	9	14	4	—	—	1	—	—	—	
Strawberry											Self-fertile.
Müller	.	9	8	7	—	—	—	1	—	—	
Wisley	.	9	9	2	1	—	—	—	—	—	
Black Currant											
Müller	.	1	—	—	—	—	—	—	—	—	
Hatton *	.	8	13	4	1	—	—	—	1	1	
Wisley	.	13	11	2	1	—	—	—	—	1	
Red and White Currants											Self-fertile.
Müller	.	5	—	—	—	—	—	—	—	—	
Wisley	.	18	14	6	1	—	2	—	—	1	
Gooseberry											
Müller	.	9	4	—	—	—	—	—	—	—	
Knuth	.	14	6	—	—	—	—	—	—	—	
Wisley	.	13	9	4	1	—	1	—	—	1	
B. WIND-POLLINATED FLOWERS.											
Mulberry											All need the carriage of pollen from one flower (or plant) to another flower (or plant).
Nuts, Cob and Filbert											
Müller	.	1	—	—	—	—	—	—	—	—	
Knuth	.	1	—	—	—	—	—	—	—	—	
Chestnut, Sweet											All need the carriage of pollen from one flower (or plant) to another flower (or plant).
Knuth	.	1	—	—	—	—	—	—	—	—	
Wisley	.	—	3	1	—	—	—	—	—	—	
Walnut											
Wisley	.	1	—	—	—	—	—	—	—	—	

\* HATTON, R. G., *Jour. of Pomology*, II., pp. 177-182.

*Wind Pollination.*—The only fruit trees that depend on wind for conveying the pollen to the stigmas are the cob, filbert and hazel nuts, sweet chestnuts, walnuts, and mulberries. The pollen of apple, pear, plum, and cherry is not adapted for wind conveyance, and the researches of the Director of Wisley,\* in England, and LEWIS and VINCENT,† in America, have clearly shown that there is no ground for supposing that their pollen is so carried. These workers suspended vaseline- or glycerin-smear glass slides at different heights amongst plantations of apple and plum, and at different distances from the trees. At Wisley the only apple and plum pollen grains collected were found near the remains of insects that had alighted on the slides. A large amount of pine pollen was caught, the nearest pine trees being about a quarter of a mile away. In the Oregon experiments, only sixty-seven apple pollen grains were found on twenty plates.

In currants and gooseberries the pollen grains are viscid and adhere together in masses, making conveyance by wind impossible, the only method of transference being through the agency of insects visiting the flowers.

It would, however, be incorrect to say that wind plays no part in the pollination of entomophilous flowers, for the effect of high winds is to diminish greatly the number of pollinating agents. High winds too often remove the petals and so decrease the attractiveness of rosaceous flowers. Moist winds, on the other hand, probably hasten the growth of the pollen tube down the stigma.

In order to prove that the petals play an active part in attracting insects, experiments were made in Oregon‡ and at Wisley. The American workers found that although flowers deprived of their petals were much less attractive, yet several insects will pay some visits to blossoms from which the corollas have been removed. In 1921 similar experiments were made at Wisley on cordon apples (see Table II.), where it was found that pollination of the petalless flowers depended on hive bees, whilst humble bees passed over the trees devoid of petals and preferred normal trees situated between and on each side of the abnormal ones.

Observations were made over 4 hours 5 minutes in all, between April 29 and May 5, 1921, at various times during the days in question, generally between 10 A.M. and 6 P.M.

TABLE II.

*Census of Insects visiting Apple Flowers with and without Petals.*

	With Petals.	Without Petals.
Hive Bees . . . .	84	23
Humble Bees . . . .	33	2
Wild Bees . . . .	6	4
Hover Flies—Eristalis . . . .	4	—
"    "    Syrphus . . . .	47	13
Midges—Sciara species . . . .	many	few

\* CHITTENDEN, F. J., *Ann. App. Biol.*, vol. i., No. 1, pp. 37-42.

† LEWIS, C. I., and VINCENT, C. C., *Oregon Agr. Exp. Sta. Bull.* 104, pp. 3-40.

‡ LEWIS, C. I., and VINCENT, C. C., *loc. cit.*

TABLE II. (*continued*).

	With Petals.	Without Petals.
Fever Flies— <i>Bibio</i> . . . .	1	—
Bee Flies— <i>Bombylius</i> . . . .	1	—
Anthomyiids . . . .	30	9
Bluebottles . . . .	3	1
Ladybirds— <i>Coccinella</i> . . . .	2	—
Other Beetles . . . .	1	1
Butterflies— <i>Pieris</i> . . . .	1	—

The prevailing wind was north-east, but the weather was mild and bright.

The removal of petals is often brought about by high winds, heavy rain, and hail showers, and it will be seen by the foregoing experiments that, provided hive bees are working in the plantation, pollination may still be effected. Hover flies (*Syrphus*) and Anthomyiids were also frequent visitors to flowers denuded of their petals.

*Insect Pollination.*—The remaining fruits depend on the visits of insects for the transference of pollen from flower to flower. The habits of the individual workers will be considered later.

*Overlapping of Flowering Periods.*—Great attention should be paid when forming plantations of apples, pears, plums, and cherries to see that the flowering periods of the respective varieties overlap. This is of the utmost importance when planting self-sterile varieties. If two self-sterile varieties, one an early-flowering and the other late-flowering, are planted together, little or no fruit will be borne on either plant, as foreign pollen is unobtainable. In plums and cherries certain varieties are inter-sterile—that is, certain varieties will not fertilize certain others, so that these varieties must be grown in close proximity to others if pollination is to be effective. Climatic conditions influence, to a certain degree, the relative flowering periods of different kinds of fruit, but lists have been drawn up whereby one can see those varieties whose flowering periods overlap (CHITTENDEN,\* RAWES,† HOOPER,‡ and Long Ashton§). It is true that interplanting of varieties interferes, to some extent, with spraying operations, but the need for this interplanting is so great that it must be done even at that risk. The closer the overlapping of flowering periods the better for pollination, and the less the interference with spraying and cultural operations.

*Self-fertility and Self-sterility.*—Our knowledge on this important subject has been increased by the work of CHITTENDEN || on apples and pears at Chelmsford and Wisley; HOOPER ¶ on apples, pears, and plums

\* CHITTENDEN, F. J., *R.H.S. Jour.*, **37**, pp. 350–361; **39**, pp. 366–372.

† RAWES, A. N., *R.H.S. Jour.*, **47**, Pt. I, pp. 8–14.

‡ HOOPER, C. H., *Gard. Chron.*, April 7 and 21, 1923, pp. 190 and 212; *Jour. Min. Agr.*, vol. xv. No. 9, pp. 678–687; vol. xvii. No. 1, pp. 32–38.

§ *Ann. Rep. Long Ashton Exp. Sta.*, 1912, pp. 78–84.

|| CHITTENDEN, F. J., *R.H.S. Jour.*, **27**, 1902, pp. cxc–cxci.; **28**, 1903, pp. clxvi.; **39**, 1914, pp. 615–628.

¶ HOOPER, C. H., *Jour. Pomology*, vol. iii. No. 4, pp. 185–190; *Jour. Min. Agr.*, xxviii. No. 2, May 1921, pp. 124–133; *R.H.S. Jour.*, **38**, 1913, pp. 238–248; **37**, 1912, pp. 531–535; **36**, 1911, pp. 548–564; *Jour. "F.B.G."* vol. i. No. 4, pp. 93–98.

at Wye; and CRANE\* and IDA SUTTON† on apples, plums, and cherries at the John Innes Horticultural Institution, Merton.

Without a knowledge of whether a variety is self-fertile or self-sterile the grower risks disappointment and monetary loss.

Some flowers, such as strawberry, raspberry, currants, and gooseberry, are self-fertile, but, with the exception of the first, it has been found that better crops result from insect-pollinated flowers (REID,‡ HOOPER§).

With very few exceptions, it is essential to interplant two or more varieties of apples, pears, plums, and cherries in order to ensure good crops of fruit. Morello cherries are self-fertile, and may be planted alone.

*The ensuring of Good Crops of Fruit.*—The factors that interfere with the production of satisfactory crops may be classified as follows:

- (1) Those outside the grower's control—unfavourable weather conditions at the time of flowering (frost, wet, windy and cold spells). Frost kills the receptive stigmas, and is one of the worst troubles with which growers have to contend. It may often be avoided by choice of site and by the use of smudge fires, the risk of frost being predicted by a Negretti and Zambra frost predictor. Wet weather washes pollen away and causes it also to lose its vitality, besides which it prevents the visits of many pollinating agents. Gales and cold winds make for fewer visitors.
- (2) Those within his control—unsuitable soil and site; poor drainage; planting of shy bearers and large areas composed of self-sterile varieties without discriminate intermixing of "pollinizers"; presence of insect pests and fungous diseases; and absence of hive bees.

*The Relation between Flowers and Insects.*—Flowers attract insects by reason of their colour and scent, and provide nectar and pollen by way of mutual exchange. Amongst Hymenopterous insects, bees suck up nectar for the production of honey and collect pollen for the manufacture of other foods for their offspring. Nectar and pollen are sought after by many other insects which either suck them up (wasps and ants, butterflies and moths; many flies, particularly hover, dung and bluebottles) or lick the nectar (beetles, weevils and earwigs), but their industry amongst flowers is far inferior to that of bees. Accessibility to the nectaries is the governing factor in the elimination of insect visitors, which may be classified for this purpose into three groups:

- I. Long-tongued bees (*Bombus* species), butterflies and moths.
- II. Short-tongued bees (*Andrena* and *Halictus* species), long-tongued flies (*Bombylius* and *Rhingia* species).

\* CRANE, M. B., *Jour. Pomology*, iii. No. 2, pp. 67-84.

† SUTTON, IDA, *Jour. Genetics*, vii. No. 4, pp. 281-300.

‡ REID, W. F., *R.H.S. Jour.*, 35, pp. 195-203.

§ HOOPER, C. H., *R.H.S. Jour.*, 37, pp. 531-535.

III. Short-tongued flies (*Eristalis* and *Syrphus* species), wasps, ants and sawflies, beetles and weevils, snake and scorpion flies, bugs, thrips, earwigs.

The structure of flowers is such that only certain species of insects are allowed to visit them. Open, shallow flowers, e.g. strawberry and apple, with exposed nectar are accessible to a great many species, and provide an open invitation to every passer-by. A large proportion of their visits are unwanted as far as possibility of pollination goes. Far more kinds of visitors go to these than to tubular flowers, e.g. currants and gooseberries. The deeper the floral envelope the fewer the visitors of groups II. and III.

At Wisley, observations have been made on individual flowers of several fruit trees on different occasions over specified times. For instance, one plum flower (May 21, 1922) was visited in fifteen minutes by 4 hive bees, 2 humble bees, 1 wild bee (*Andrena*), 2 bluebottles, 3 hover flies (1 *Eristalis* and 2 *Syrphus*), and several midges (*Sciara*). As the chances of pollination increase with the number of insects visiting, it is an advantage from the flower's standpoint to obtain as many insects as possible. The more industrious insects are, the more advantageous to the flower, whilst many insects are only casual visitors and may be disregarded (*cf.* WILSON\*).

Where plantations of plum and pear adjoin, it was found that the former are preferred to the latter by most insects, with the exception of midges, bluebottles, and certain muscids, which are attracted by the hawthorn odour of pear blossoms. Currants and gooseberries are often interplanted with standard fruit trees, and it was found in the experimental garden at Wisley that the flowers of currants and gooseberry are deserted when cherries are in full flower. Humble and wild bees and, to a lesser degree, hive bees will visit plum flowers after pears. On May 7, 1922, a large flowering branch of plum ('Ickworth Imperatrice') was placed amongst the branches of pear ('Huyshe's Prince Consort') in full flower, with the result that hive, humble and wild bees, hover and fever flies and midges were enticed away from the flowers of pear and went to those of the plum. When, however, a pear branch was placed amongst plum branches in full flower insects were not attracted from the plum to the pear. On April 30, 1922, a branch of pear ('Jargonelle') was fixed amongst the flowers of a plum tree ('Early Yellow Mirabelle,') when only one humble bee (*Bombus terrestris*) visited the introduced flowers; the other insects present on the plum flowers quite ignored the presence of the pear blossoms.

*Pollinating Insects and the Transmission of Pathogenic Organisms.*

—That there is danger arising from the visits of pollinating agents to fruit blossoms is not to be disputed, but this is somewhat outside the scope of the present paper, and will form the subject of a later communication.

*Spraying and Bees.*—A warning against the danger of spraying fruit plantations with lead arsenate during the blossoming period was

\* WILSON, A. S., *Knowledge*, Dec. 1, 1894, pp. 280-283.

issued to the Press\* by the Council of the Royal Horticultural Society in the spring of 1924. Professor THEOBALD issued a similar warning against this practice in 1921.† Lead arsenate and nicotine washes are toxic to bees and other insects, and the loss sustained by thoughtless spraying is to be deplored. A difficulty arises in the case of the raspberry beetle (*Byturus tomentosus* F.), the ravages of which are checked by spraying the plants with lead arsenate when the flowers are one-third, two-thirds, and fully open, but it is urged ‡ that a deterrent (e.g. 'Milko' which is used in America) be added to the arsenical wash which will overcome this difficulty.

*The Effect of Weather on the Visits of Pollinating Insects.*—Weather conditions, such as amount of sunshine, wind, rain, and temperature, play a large part in governing the numbers of insects to fruit blossoms. Observations carried over several years at Wisley show that weather is one of the most important factors. The following examples will suffice to show the effect of (i) sun, (ii) cloud, (iii) high wind, (iv) rain, and (v) hail on the number of visitors to pear flowers in 1921 :

	(i) Bright Sun, April 10, 20 mins.	(ii) Overcast, March 31, 20 mins.	(iii) Strong N.E. Wind, April 9, 20 mins.	(iv) Heavy Rain, March 14, 20 mins.	(v) Hail Shower, April 14, 20 mins.
Hive Bees .	14	—	—	—	—
Humble Bees .	9	—	3	1	1
Wild Bees .	14	—	—	—	—
Hover Flies .	10	2	—	—	—
Fever Flies .	2	—	—	—	—
Midges .	33	3	—	2	—
Bluebottles .	3	1	—	—	—
Dung Flies .	2	—	—	—	—
Other Flies .	4	3	—	—	—

At East Malling § similar observations were made as to the effect of various types of weather on the numbers of insect visitors to black-currant flowers.

To show the effect of alternating sunny, cloudy, and rainy periods on insects, the following census taken on a plum tree ('President') on April 27, 1922, is appended. The weather was cool, with an average temperature of 42° F., cloudy with intermittent bursts of sunshine, and a cool westerly wind (12 m.p.h.). The observations lasted one hour, 11.40 A.M. to 12.40 P.M.

11.40 A.M.—11.55 A.M.—7 humble bees (5 *Bombus lucorum*, 2 *B. terrestris*)

Sunny period      1 wild bee (*Andrena*)  
                          1 *Eristalis*  
                          4 bluebottles  
                          numerous midges

11.55 A.M.—12.5 P.M.—2 humble bees (1 *B. lucorum*, 1 *B. terrestris*)

Sun obscured  
 by clouds

\* *The Gardeners' Chronicle*, April 19, 1924, p. 216.

† THEOBALD, Prof. F. V., *Fruitgrower*, March 31, 1921, p. 584.

‡ PEREN, G. S., *Ann. Rep. Long Ashton Exp. Sta.*, 1922, pp. 62–66.

§ WELLINGTON, HATTON and AMOS, *Jour. Pomology*, ii. No. 3, pp. 160–198.

- 12.5 P.M.—12.25 P.M.—8 humble bees (6 *B. lucorum*, 2 *B. terrestris*)  
Sunny period 5 bluebottles
- 12.25 P.M.—12.33 P.M.—5 humble bees (4 *B. lucorum*, 1 *B. terrestris*)  
Dull and colder 6 bluebottles  
1 Anthomyiid  
1 ladybird
- 12.33 P.M.—12.40 P.M.—4 humble bees (3 *B. lucorum*, 1 *B. terrestris*)  
Rain shower 1 dung fly (*Scatophaga*)

The foregoing shows the disregard that humble bees have for different kinds of weather, and a large number of similar observations (Tables III., IV., and V.) show even more strikingly the fact that pollination depends on humble bees and certain other insects during periods of inclement weather. Hive bees were not present in the orchard on the 27th, although they were seen the day before and two days later. The cool temperature and wind did not tempt them to make the journey of a quarter of a mile away from their hive.

TABLE III.

*The Effect of Weather on Insects' Visits.*

## I. Apples

	April 15, 1921, 30 mins. 2.45-3.15 P.M. Snow showers with sunny intervals, slight north wind, temp. 38° F.	April 30, 1921, 30 mins. 11.15-11.45 A.M. Bright sun, slight northerly wind, temp. 64° F.	May 4, 1921, 30 mins. 11-11.30 P.M. Overcast with showers, slight S.E. wind, temp. 43-5° F.	May 11, 1921, 30 mins. 11-11.30 A.M. Overcast and close, slight east wind, temp. 59° F.
Hive Bees . . . . .	—	17	—	—
Humble Bees. . . . .	1	5	3	14
Wild Bees . . . . .	—	21	—	—
Wasps . . . . .	—	1	—	—
Ants . . . . .	—	1	—	—
Sawflies . . . . .	—	1	—	—
Hover Flies— <i>Eristalis</i> . . . . .	—	3	—	1
"    " <i>Syrphus</i> . . . . .	—	10	—	—
Fever Flies— <i>Bibio</i> . . . . .	—	1	—	2
Midges— <i>Sciara</i> . . . . .	7	very numerous	10	numerous
Anthomyiids . . . . .	—	8	—	—
Bluebottles . . . . .	—	1	—	—
Other Flies . . . . .	—	3	—	—
Beetles . . . . .	1	1	—	—
Butterflies and Moths . . . . .	—	1	—	—

TABLE IV.

## II. Pears

	April 25, 1922, 30 mins. 4-4.30 P.M. Overcast with N.W. wind, temp. 46° F.	May 9, 1922, 30 mins. 12.10-12.40 P.M. Bright sun, calm, temp. 73° F.	May 10, 1922, 30 mins. 12-12.30 P.M. Overcast with slight N.E. wind, temp. 56° F.	May 11, 1922, 30 mins. 3.55-4.25 P.M. Dull with partly obscured sun, hazy, slight S.E. wind, temp. 51-5° F.
Hive Bees . . . . .	—	11	—	1
Humble Bees. . . . .	2	1	—	2
Wild Bees . . . . .	—	13	—	—
Wasps . . . . .	—	1	—	1
Ants . . . . .	—	1	—	—
<i>Eristalis</i> . . . . .	—	12	—	—
<i>Syrphus</i> . . . . .	—	4	—	—

TABLE IV. (*continued*).II. Pears (*continued*)

	April 25, 1922, 30 mins. 4-4.30 P.M. Overcast with N.W. wind, temp. 46° F.	May 9, 1922, 30 mins. 12.10-12.40 P.M. Bright sun, calm, temp. 73° F.	May 10, 1922, 30 mins. 12-12.30 P.M. Overcast with slight N.E. wind, temp. 56° F.	May 11, 1922, 30 mins. 3.55-4.25 P.M. Dull with partly obscured sun, hazy, slight S.E. wind, temp. 51.5° F.
Bibio . . . . .	—	I	—	—
Sciara . . . . .	5	very numerous	9	—
Anthomyiids. . . . .	—	numerous	2	2
Bluebottles . . . . .	—	2	5	1
Other Flies . . . . .	—	4	—	—
Beetles . . . . .	—	7	—	—
Butterflies and Moths . . . . .	—	—	—	—

TABLE V.

## III. Plums

	April 29, 1922, 30 mins. 10.55-11.25 A.M. Bright sun with passing clouds, calm, temp. 54° F.	May 1, 1922, 30 mins. 10-10.30 A.M. Bright at first, turning to heavy rain showers, slight N.W. wind, temp. 47° F.	May 3, 1922, 30 mins. 2.30-3 P.M. Very dull with light showers, slight S.W. wind, temp. 53.5° F.	April 24, 1922, 30 mins. 3.40-4.10 P.M. During a heavy shower which lasted 20 mins., Westerly wind, trees exposed.
Hive Bees . . . . .	2	—	—	—
Humble Bees. . . . .	12	3	3	5
Wild Bees . . . . .	7	—	—	—
Wasps . . . . .	1	—	—	—
Ants . . . . .	2	—	—	—
Eristalis . . . . .	4	—	—	—
Syrphus . . . . .	1	—	—	—
Bibio . . . . .	1	—	—	—
Sciara . . . . .	numerous	—	—	—
Anthomyiids . . . . .	2	—	1	—
Bluebottles . . . . .	3	2	1	—
Other Flies . . . . .	1	—	—	—
Beetles . . . . .	1	—	—	—
Butterflies . . . . .	1	—	—	—

*The Habits of Individual Insects Pollinating Fruit Trees.*—Prior to considering the habits of the individual insects, the habitats of the chief pollinators of fruit flowers are tabulated under their respective Orders and Families (Table VI.).

TABLE VI.

*Breeding Places of Chief Insect Visitors to Hardy Fruit Flowers.*

## Hymenoptera

- Apidae.* Hive Bees (*Apis mellifica*, *A. ligustica*). . . . . Domesticated—in hives, occasionally in trees and roofs.  
Humble Bees (*Bombus* species) . . . . . In hedge banks, grass tufts, and moss.  
Mason Bee (*Osmia rufa*) . . . . . In ground, stone walls, and old snail shells.
- Andrenidae.* Other Wild Bees (*Andrena* and *Halictus* species) . . . . . In paths, walls, banks, posts, hollow stems, amongst grass roots.
- Vespidæ.* Social Wasps (*Vespa* species) . . . . . In the ground or suspended from trees and shrubs.



## Diptera

- Mycetophilidae*. Midges (*Sciara* species) . . . In decaying vegetable refuse, cow dung, and beneath decayed bark of trees.
- Bibionidae*. Fever and St. Mark's Flies (Bibio and Dilophus species) . . . In living and decaying vegetable matter.
- Bombyliidae*. Bee Flies (*Bombylius* sp.) . . . Larvæ parasitic upon species of *Andrena*, *Halictus*, and *Colletes*.
- Syrphidae*. Hover Flies.
- Eristalis* species . . . In stagnant water containing decaying vegetable matter; in mud and dung.
- Syrphus* species . . . Larvæ predaceous, feeding on plant lice (Aphides).
- Volucella* species . . . Scavengers in nests of Humble Bees and Social Wasps.
- Rhingia rostrata* . . . In cow manure.
- Corāyluridae*. Dung Flies (*Scatophaga stercoraria*) . . . In cow manure.
- Anthomyidae*. Anthomyiids . . . In living and decaying vegetable matter and manure.
- Muscidae*. Bluebottles and Greenbottles (*Calliphora* and *Lucilia* species) . . . In decaying animal and vegetable matter.

## Coleoptera

- Nitidulidae*. Mustard Beetle (*Meligethes aeneus*) . . . In vegetable matter.
- Coccinellidae*. Ladybirds (*Adalia* and *Coccinella* species) . . . Larvæ predaceous, feeding on plant lice (Aphides).

## Lepidoptera

- Rhopalocera*, Butterflies,  
*Heterocera*, Moths . . . Larvæ phytophagous (plant feeders).

## ORDER HYMENOPTERA.

## Family Apidae.

Because of their body structure (modified posterior pair of legs with special pollen-collecting apparatus and their mouth parts capable of reaching the nectar supplies in flowers) and their industrious habits bees, and more particularly hive bees, are well equipped for playing the most important part in pollination. MÜLLER\* and KNUTH† describe in detail the modifications in body structure of the various insects which visit flowers for food.

Our first consideration will be hive bees, for they are the only insects whose numbers can be regulated by man, who by placing hives amongst orchards can increase the chance of pollination and a good crop. If the weather conditions be inclement, and the hives be placed some distance away from trees, the bees will not wander from home, and pollination at such times depends on the visits of other insects, in particular humble and other wild bees. The number of hives that are necessary for efficient work depends on the size of the trees and the acreage, but

\* MÜLLER, H., *The Fertilization of Flowers*, 1883, pp. 30-67.

† KNUTH, P., *Handbook of Flower Pollination*, 1906, vol. i. pp. 145-190.

a good plan is to place one hive to every two acres of fruit. Fruit plantations situated like those at Wisley, surrounded as they are by common land, pastures, and open country, can and do depend for pollination on wild insects. Where large areas are devoted to one particular crop and where trees are growing in towns, it is essential that hive bees should be introduced, for in neither case are there sufficient wild insects to carry out this important work.

Bees visit flowers for the dual purpose of obtaining nectar, which is converted into honey, and pollen, a farinaceous food used in brood-rearing and as a heat and energy-forming element in their own diet. Both honey and pollen are stored in special cells within the hive. The mutual advantage is that the flowers are pollinated through the transference of pollen from one variety to another, an important factor in those flowers whose stamens or stigma ripen at different times. The hairy bodies of bees are specially adapted for this work, and the pollen grains are caught in the hair on the legs and abdomen.

Hive bees tend to fly against the wind when leaving the hive so that the return journey may be facilitated, loaded as they are then with pollen or nectar.

This habit was particularly noticeable in the spring of 1921, when the nearest hives to the Wisley plantations were situated about one mile away in a westerly direction. Given similar meteorological conditions, as far as amount of sunshine and temperature went, larger numbers were found in the apple, pear, and plum orchards when the wind was in a south-easterly direction than when a south-west wind was blowing.

Hive bees make for the newly opened flowers of apples, pears, plums, and cherries, and are found in greater number on those trees which have 50 per cent. of their blossoms open than when the same trees are in full blossom. Of all the numerous insects visiting fruit flowers, there is less overlapping in the case of honey bees than with any other species. Although it is stated that bees confine their attention to one kind of flower during visits to an orchard, it was found that they often visited plums after pears and cherries after apples, but they have been seen to wander only to closely allied plants and not from rosaceous plants to currants and gooseberry. Bees will, in their more diligent and systematic search for nectar, visit flowers whose petals have been removed either through natural reasons or artificially (Table II.). False flowers did not attract bees unless nectar was placed on them, in which case the odour proved the attraction, the olfactory sense of bees being very acute.

The number of flowers visited by hive bees in one minute depends on the type of flower, whether the nectaries are easily accessible, and weather conditions. During bright sunny weather the rate of visits is somewhat accelerated, and a long series of experiments carried out on marked bees in their visits to apple, pear, plum, and cherry flowers show that an average number of 9.6 flowers are visited in one minute. In the case of currant and gooseberry flowers, the average worked out at 8 a minute. During cloudy intervals on sunny days,

and in the event of a wind springing up, their visits averaged 6.5 a minute, and as the weather conditions became stormier their visits ceased altogether.

Some striking instances of the dislike of certain varieties of apple flowers have been noticed. Pink-flowered varieties are not favoured by many insects, whilst hive bees show no discrimination between white and pink flowers. On May 21, 1922, an apple tree (var. 'Northern Greening') with pink flowers was, with the exception of hive bees, deserted by pollinating insects, although adjoining trees with white flowers were swarming with humble bees, wild bees, and flies.

Hive bees usually alight on the petals (fig. 57), and differ in this respect from wild bees (*Osmia* and *Andrenas*), which usually land in the centre of the flower. Two species have been found on all the entomophilous flowers at Wisley, viz. the common honey bee, *Apis mellifica* L. (fig. 58, 1) and the Ligurian bee, *A. ligustica* Spin. The latter is a hardier species and was introduced into Britain from northern Italy. It can be distinguished from the former by its slightly larger size and the presence of three tawny abdominal bands. Hybrids between the two species are common, and many variations in body markings occur.

*Humble Bees*.—Eight species have been taken on fruit flowers at Wisley, the commonest being *Bombus lucorum* Smith (fig. 58, 2-3), *B. terrestris* L., *B. helveranus* Seidl (fig. 58, 4, 5) and *B. lapidarius* L. These species are widely distributed and may be found in orchards all over the country, and have been taken on isolated fruit trees in the centre of a large town. Their visits to flowers are for the same reason as their more intelligent brethren—that is, the collection of pollen and nectar, which are stored away in cells. Where very large areas of fruit are grown, it is impossible for humble bees to complete the necessary amount of work, so that it is advisable to introduce hive bees to make certain that a good set of fruit is obtained. Their work is thorough, and during the spring of 1920, when no hive bees were seen in the apple plantations at Wisley, the work of pollination depended chiefly on humble bees, and the resulting crop was above the average.

Humble bees may be divided into two groups: (i) surface builders, such as *B. agrorum* F., *B. pratorum* L., and *B. jonellus* Kirby; and (ii) underground builders, *B. lucorum*, *B. terrestris*, and *B. lapidarius*. The visits of the first group are somewhat affected by ground frosts, so that the minimum temperature on the grass and soil one foot down may influence pollination.

Whereas hive bees are fine-weather workers, their visits decrease to zero when the weather is cold and stormy, and the work of pollination is left to other insects, of which humble bees are the most important. *Bombus* species have been found at work amongst fruit trees during:

(1) High winds and gales, when they are often blown about and experience great difficulty in returning to their nests, loaded as they are

with pollen. The only insects found visiting the plum orchard on May 3, 1922, were humble bees. Between 2.30 P.M. and 3.30 P.M.—the sky was overcast with occasional showers and a 10-m.p.h. south-westerly wind was blowing—the only insects observed were three *B. lucorum*. One at 2.40 P.M. visited 22 flowers, returned to its nest and on its return visited 3 flowers, and another at 3.10 P.M. visited 31 flowers. The bees were sluggish, and were blown about a great deal as they prepared to alight on the trees.

(2) Cold winds do not deter these sturdy insects. On April 9, 1921, the only visitors to pear flowers were several specimens of *B. lucorum*. The observations were made between 11 A.M. and 12.30 P.M., when a cold north-westerly wind was blowing (6 m.p.h.) with a screen temperature of 39° F.

(3) Heavy and continual rain. Between the 10th and 12th of April, 1920, nearly half an inch of rain fell. Sometimes the weather was showery and at other times the rain continued for two or three hours, and visits to the pear plantation, covering a period of two hours on these days, resulted in observing humble bees at work, mostly *B. terrestris*. On April 12, 1923, during heavy rain (1.40 P.M. and 2.5 P.M.) the only pollinating insects in the gooseberry and currant plantations were seven *B. lucorum*. During a visit to Messrs. SEABROOK'S orchards on April 30, 1923, heavy rain fell between 2.30 P.M. and 4.30 P.M., but this did not deter humble bees from visiting black-currant flowers, for several specimens of *B. lucorum* and *B. lapidarius* were observed flitting from flower to flower.

(4) Snow and hail showers will prevent most insects from leaving shelter, but we have several records of humble bees working through such weather. During a hail shower (April 14, 1921), which fell between the hours of 3 P.M. and 4 P.M., several humble bees worked without ceasing on pear flowers. On April 9, 1923, snow showers were experienced at Wisley, and a visit to the plum plantation at 11 A.M. was rewarded by seeing these insects carrying on their work, although many flowers were covered in snow. In the course of half an hour one *B. lucorum* was observed to visit 11 flowers of 'Prince Englebert,' the only other insect present being a bluebottle, which visited 2 flowers of the same variety. Another bee of the same species visited 5 flowers of 'Imperial de Milan' and flew to 'Cox's Emperor,' where it visited 7 flowers.

(5) Dull, overcast days are not conducive to pollinating insects, but we have several records showing that humble bees work on fruit flowers during such periods even when cold northerly and easterly winds are blowing.

(6) Early morning and late evening—humble bees are at work earlier and later than any other pollinating insects. Specimens of the three commonest species have been found on apple and plum flowers as early as 5 A.M., and work until darkness sets in, usually about 9 P.M. in the middle of May.

The larger species usually alight on the uppermost branches of

bush trees and work downward. *B. lapidarius* generally prefers to keep to the higher branches of apples, pears, plums, and cherries.

Their work may not be as systematic as that of hive bees, for they pass over flowers denuded of their petals, choosing flowers whose floral envelope is conspicuous and undamaged. In cold weather their habits are inclined to be erratic and their visits less regular, for they flit from tree to tree, visiting only a few flowers on each. Currants and gooseberry bushes are not worked by humble bees with the same industry as rosaceous flowers. Strawberry flowers are visited irregularly. One *B. lapidarius* ♀ in seventy seconds visited 3, 1, 2, 4 and 1 flowers on five plants. One *B. lucorum* ♀ visited in one minute 3, 2, 2, 1 and 4 flowers, and another neuter of the same species visited 2, 3 and 5 flowers on different plants. On black currants one neuter *B. lucorum* visited 2, 1, 23, 14, 5 and 2 flowers on different bushes in forty seconds. On apple, pear, and plum trees, *B. lucorum* and *B. terrestris* visited on an average 16 flowers a minute, whilst *B. lapidarius* visited fewer, an average of 12 flowers a minute.

The following will show the movements of two specimens of *B. lucorum* in a plum plantation (April 15, 1923). The weather was mainly overcast, with sunny intervals, some showers, and a strong south-east wind; screen temperature, 45° F.

No. 1	visited 16 flowers of 'Early Orleans'	in 50 seconds.
"	" 5 " 'Victoria'	" 20 "
"	" 4 " 'Transparent Gage'	" 16 "
No. 2	" 19 " 'Transparent Gage'	" 56 "
"	" 126 " 'Laxton's Superior'	" 7 mins. 40 secs.
"	" 6 " 'Reine Claude de Comte Hathow'	" 15 seconds
"	" 39 " 'Pond's Seedling'	" 2 mins. 5 secs.

Humble bees are less particular than hive bees in their visits to flowers of closely allied species of plants, for they readily visit plum flowers after pears and fly from gooseberry to black currant, but have not been observed to go to red currant after gooseberry. Pear flowers are not favoured, their work amongst them being more fitful.

The damage to leguminous flowers by humble bees is well known, for it has become a habit of certain species to bite a hole in the corolla in order to reach the nectar, thereby defeating the object of the flower, which is to ensure cross-pollination. In apple flowers, two *B. lucorum* have been seen to reach the nectaries through the holes made by the apple-blossom weevil for oviposition purposes.

Where cherries are grown close to plantations of currants and gooseberries, the flowers of the former prove more attractive than the less conspicuous flowers of the latter. This was particularly noticeable at Wisley in April 1923, when the cherry flowers were visited by large numbers of humble bees, whilst the currant and gooseberry bushes growing near were almost deserted.

Preference is shown for white-flowered varieties of apples. Pink-flowered varieties, such as 'The Sandringham' and 'Northern Greening,' were visited by comparatively few humble bees, whilst neighbouring white-flowered varieties were full of them. The preference is often difficult to account for. For instance, the flowers of the plum 'Bryanstone Gage,' with brown, frost-bitten petals, were much more attractive to bees than those of its near neighbour, 'Boulouf,' which was flowering profusely and in which the petals were undamaged.

*Other Wild Bees.*—*Psithyrus quadricolor* Lep., one of the "cuckoo" bees associated with *B. pratorum* and *B. jonellus*, was found occasionally on the flowers of loganberry and blackberry. These bees resemble their hosts, but have not the pollen-carrying adaptations on the posterior legs, for they lay their eggs in the nests of humble bees, whose workers feed the larvæ of the "cuckoo." Their visits to flowers are entirely for selfish reasons, and their unmethodical habits make them practically useless from a pollination standpoint.

*Osmia rufa* L., one of the mason bees, is a constant visitor to the flowers of apple, pear, plum, cherry, currants, and gooseberry, and although its movements are somewhat slow it plays an important part in the pollination of these flowers. It is a thorough worker, and crawls all over the floral organs in its search for food. The average number of flowers visited in one minute was five.

*Andrenidae.*—This large family comprises those insects known as solitary bees. Species of *Andrena* and *Halictus* are very common on fruit flowers and are thorough workers, crawling all over the stamens and stigmas. They are slow, and easily disturbed by bees and other insects which happen to visit flowers on which they are working. At the approach of man they fly about and take some time before they settle, and will return again and again to the same flower.

They prefer to work on sunny and warm days, when they can be found in large numbers—as many as thirty-seven have been counted on one small bush pear. During cloudy intervals on sunny days they rest in the flowers or on the ground, returning to their labours on the reappearance of the sun.

They collect pollen from apple, pear, plum, and cherry trees, whilst currant and gooseberry flowers are visited for their nectar. Unlike humble bees, they show no preference for white-flowered varieties of apples, visiting white and pink flowers indiscriminately.

Plum flowers are visited after pears, and they readily went from the one to the other when branches of one were placed amongst the other.

Twelve species have been taken on fruit flowers, the two most commonly met with being *Andrena fulva* Schr. (fig. 58, 6) and *A. albicans* Kirby (fig. 58, 7), which have been found on all the insect-pollinated flowers, with the exception of almond, medlar and peach. The former species is easily recognized by the reddish bands on the abdomen, whilst the latter species has a dark abdomen, with a reddish tuft of hairs at the posterior end. *A. albicans* and *A. thoracica* Fab.



FIG. 57.—HIVE BEES WORKING IN PLUM FLOWERS.

[To face p. 240.

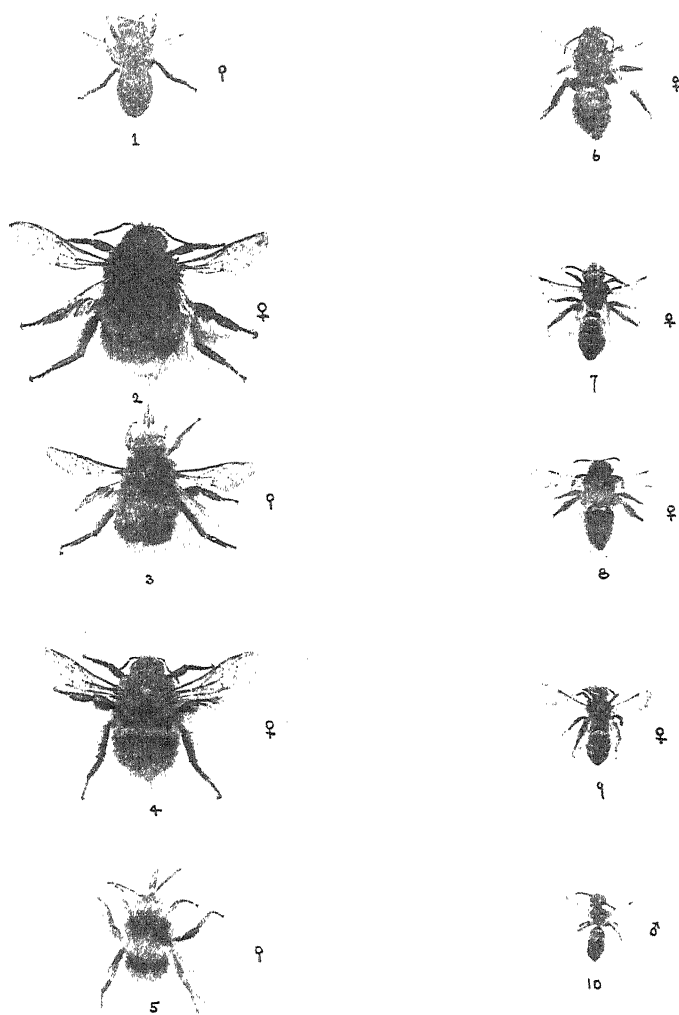


FIG. 58.—INSECTS VISITING FRUIT FLOWERS.

1, The hive bee ; 2-5, humble bees ; 6-10, various wild bees (see text).  
(All natural size.)



were commonly met with on flowers of raspberry, loganberry, currants, and gooseberry. Other common species were *A. Gwynana* Kirby (fig. 58, 8) and *A. dorsata* Kirby (fig. 58, 9 and 10).

Other Andrenidae taken on flowers were *Halictus rubicundus* Christ. on pear; *H. cylindricus* Fab. on plum; *H. punctatissimus* Schenk. on raspberry; and *H. morio* Fab. on loganberry. Their habits are similar to those of *Andrena* species, but their numbers are fewer.

*Sphecodes gibbus* L. is fairly frequent on apple, plum, and cherry flowers. "Sphecode" bees are sometimes "cuckoos" in the nests of *Halictus*, but have also been observed to make burrows for themselves.

Some of the early appearing species of Andrenidae are double-brooded, so that the second brood is seen later in the year. They are all solitary bees having short and pointed "tongues."

*Vespidæ*.—Many queens of the social species of wasps (*Vespa rufa* L., *V. sylvestris* Scop., and *V. vulgaris* L.) were found on fruit flowers during the early spring, when visits were made for pollen and nectar, and some have been found searching the flower clusters for plant lice and caterpillars as food for their offspring. Wasps have not been found on raspberry, loganberry, and strawberry flowers, as at the time these are in flower the queens do not leave their nest, and the workers are engaged in collecting aphides, caterpillars, and other insects. Occasionally queen wasps have been observed to visit the nectaries on the leaves of cherries (May 9, 1922).

*Eumenidæ*.—Solitary wasps belonging to this family are carnivorous in their habits, so that they are not expected visitors to fruit flowers. A few specimens of *Odynerus callosus* Thoms. have been taken on plum flowers (May 9, 1922), when the attraction appeared to be some plum aphides that were crawling over the corolla.

*Formicidæ*.—Ants, although frequent visitors to flowers, cannot be considered as useful pollinating agents, on account of their robbing habits. Many specimens of *Lasius niger* Linn. have been taken on fruit flowers, which they have been visiting for the purpose of collecting pollen and nectar. They are not particular about damaging the flower buds of pears, which they bite through in order to reach the nectar.

*Tenthredinidæ*.—This family comprises some of our worst pests, in the form of sawfly larvæ. Sawflies are unwanted visitors to flowers, especially the apple species (*Hoplocampa testudinea* Klug.), which chooses the open flowers in which to lay eggs. They are common objects on sunny days, when they sit on the blossoms, in which they lay their eggs. They were particularly prevalent in the spring of 1922 and 1925, both being bad sawfly years at Wisley.

The other species commonly caught on the flowers of currants and gooseberry was *Nematus ribesii* Scop., which, unlike the last species, deposit their eggs on the leaves of these plants; their visits to the flowers are for the purpose of licking the nectar.

## ORDER DIPTERA.

This order comprises two-winged flies, which will be considered under their respective families.

*Cecidomyiidae*.—A family comprising the gall flies, of which the only species taken has been the pear midge, *Diplosis pyrivora* Riley. Many specimens have been taken at Wisley in the act of ovipositing in the unopened and open flowers. The eggs are found attached to or placed amongst the anthers, and the larvæ on hatching feed in the young fruit. This is an unwanted visitor, but occurs in most pear orchards.

*Mycetophilidae*.—In numbers the members of this family, commonly called midges or fungus gnats, far surpass all other pollinating insects on apples, pears, plums, and cherries. Whilst many of them are very small and insignificant and their visits less purposeful, they do distribute a large amount of pollen. They are found from early morning to late at night amongst flowers, and are present in stormy weather when very few insects are seen.

In Table VII. these insects are listed as *Sciara*, as most of the midges taken on fruit flowers belonged to this genus.

*Bibionidae*.—Two species of *Bibio*, or fever flies, have been taken on fruit flowers, *B. hortulanus* L. and *B. marci* L. (fig. 59, 7), the latter, better known as the St. Mark's Fly, by reason of its appearance about the time of St. Mark's Day, continuing abundant throughout May. These rather clumsy flies are abundant on rosaceous flowers, but not on currants. They are less erratic in their habits than hover flies, and may be considered as useful pollinating agents.

The most prevalent species is a much smaller fly, *Dilophus febrilis* L., which abounds on the flowers of apple, pear, and cherry, and is a most useful pollinator. The larvæ of these flies are often injurious to the roots of hop, celery, and other plants.

*Bombyliidae*.—Only one species of bee fly, *Bombylius major* L. (fig. 59, 6), was taken on apple flowers, to which it was a frequent visitor on bright sunny days. Its hum quickly attracts attention, for the note is higher than that of humble bees, some species of which it somewhat resembles. It is provided with a very long "tongue," by means of which it can obtain nectar from deep tubular flowers, such as primroses.

*Syrphidae*.—A family which includes some important pollinating agents, the hover flies, species of *Eristalis* and *Syrphus*.

Five species of the first-named genus have been taken on rosaceous flowers, the commonest being *E. arbustorum* L. (fig. 59, 2), *E. tenax* L. (fig. 59, 1), and *E. pertinax* Scop. Currant flowers are not so favoured as are those of gooseberries. These flies are constant attendants of flowers, but unsystematic in their habits, for they will revisit the same flower many times. They feed on nectar and pollen; the trunk-like mouth parts can be seen moving over the stamens and drawing up the pollen grains. The two larger species, *E. tenax* and *E. pertinax*, both in the way they settle on flowers and the position taken up by the hind legs when flying, resemble hive bees, from which they differ markedly

by possessing only one pair of wings to the bee's two pairs. The similarity is so marked that the untrained observer can be misled as to their identity.

*E. intricarius* visits apple flowers, but with less regularity than the other species. It resembles the large narcissus fly, *Merodon equestris* F., and like it is very agile on the wing. It flits from flower to flower, visiting only two or three flowers on each tree.

Syrphids are very frequent visitors to fruit flowers, and to the apple show marked preference. They feed on nectar and pollen, and are found abundantly on sunny days. After hive bees, they were the most frequent visitors to apple flowers denuded of their petals (Table II.), to which they were attracted by the scent. *Syrphus torvus* O.S. (fig. 59, 3) and *S. ribesii* L. (fig. 59, 4) were the two most commonly met with species on blossoms of rosaceous plants, and the latter was a frequent visitor to currant and gooseberry flowers.

Like Eristalis they are rather erratic in their flight, and spend a large amount of time hovering in the air above trees and bushes.

Two species of Volucella, *V. bombylans* L. and *V. pellucens* L., were taken on apple, plum, raspberry, and loganberry flowers; but they cannot be considered as first-rate agents, for they are casual and will often fly away in company with *Bombus* species, in whose nests the larvæ are scavengers.

Many other members of this family were found on flowers; mention of two only may be made—*Platycheirus albimanus* F., and *Rhingia campestris* Meig. The former resembles a small Syrphus, and by reason of its numbers it may be classed as a useful insect. The latter, which possesses a long "tongue," is a true flower lover, and was an industrious and frequent worker on apple, pear, and cherry flowers.

*Conopidae*.—Only one species of this family has been seen on fruit blossoms—*Myopa polystigma* R. (fig. 59, 5), a sluggish insect with a blunt head. Several specimens have been seen on apple and cherry flowers, and for this reason it is included in this list. Unlike most insects, this species will allow itself to be touched, and is not easily disturbed. The larvæ are parasitic on the larvæ of bees.

*Cordyluridae*.—The only species worthy of note is *Scatophaga stercoraria* L., the well-known dung fly (fig. 59, 8), for it is frequently found on fruit flowers, being partial to pears. The male, which is the larger of the sexes and covered with tawny hairs, is more often found than the female, which is a much dingier looking insect.

*Anthomyiidae*.—This family includes many well-known pests, such as the cabbage, onion, mangold, and carnation flies, but from the standpoint of pollinating agents they are useful. We have taken many species, many of them unidentified. They are present in large numbers in orchards during blossoming time, being partial to rosaceous flowers, from which they can obtain the easily accessible nectar. A few have been found on blackberry, loganberry, and raspberry flowers, but not in such numbers as on fruit trees.

Their work cannot be ignored, for, although small, they are indefatigable workers, even in cold and stormy weather.

Bluebottles (fig. 59, 9) are important agents in the pollinating of certain flowers, more especially pear and plum. The common species, *Calliphora erythrocephala* L., was found on pears during rain, when the only other insects present were humble bees. They feed on nectar, and have often been observed to suck up rain and dewdrops on the petals. Their work is somewhat unstable, for they are easily disturbed and fly away, but they are not to be despised on that account.

Greenbottles, *Lucilia caesar* L. (fig. 59, 10), are also flower visitors, but as so few have been seen they are not worthy to be classed amongst the chief pollinating agents.

Many other flies have been taken, but most of them need not be considered, as they are casuals. Exception may be made of one of the muscids, *Musca autumnalis* (fig. 59, 11), a common attendant on the apple, pear, plum, and cherry flowers, which was found during dull weather when other insects were scarce. It may be passed over as a common house fly, which it slightly resembles. The other fly worthy of notice is one of the flesh flies, *Sarcophaga carnaria* L., of frequent occurrence on the flowers of blackberry, loganberry, and raspberry.

#### ORDER COLEOPTERA.

This order comprises all the beetles, and, whilst many have been found on flowers, some are unwanted by reason of their phytophagous habits. Some of these are the apple-blossom weevil, *Anthonomus pomorum* L.; click beetles, *Elatér* and other species, which sometimes devour the floral organs of apple, plum, and currant; snout weevils, *Rhynchites aequatus* L. and species of *Phyllobius*, which, besides licking the nectar of apple and quince flowers, devour the petals and stamens; and the raspberry beetle, *Byturus tomentosus* F., which is a serious pest on raspberry and loganberry. All the beetles taken on flowers (twenty-two have been identified from apples) were seen licking the nectar, and some of them devouring the floral organs as well. The most useful agents are the ladybirds, *Coccinella* species, which, besides their carnivorous habits in feeding on plant lice, perform a certain amount of useful pollination work. Four species have been observed (2, 7, 11 and 14-spotted) on most flowers, records showing that they were very prevalent on currants and gooseberry.

One of the dung beetles, *Aphodius inquinatus* F., is constantly found crawling over the flowers of apples and currants and licking the nectar.

The most numerous of all beetles found in flowers was the mustard beetle, *Meligethes aeneus* F.—as many as nine were found in one pear flower. It is not content with the nectar provided, but will feed on the petals, so that its absence rather than its presence is desired.

A large yellow and black beetle, *Strangalia armata* Herbst., resembling a large wasp beetle (*Clytus arietis* L.), was often seen on raspberry and blackberry flowers, which it visits for nectar and pollen, and also to feed on the floral organs.



FIG. 59.—INSECTS VISITING FRUIT FLOWERS.  
 1-5, Hover flies ; 6, Bee fly ; 7, St. Mark's fly ; 8, Dung fly ; 9, Bluebottle ;  
 10, Greenbottle ; 11, Muscid. (All natural size.)

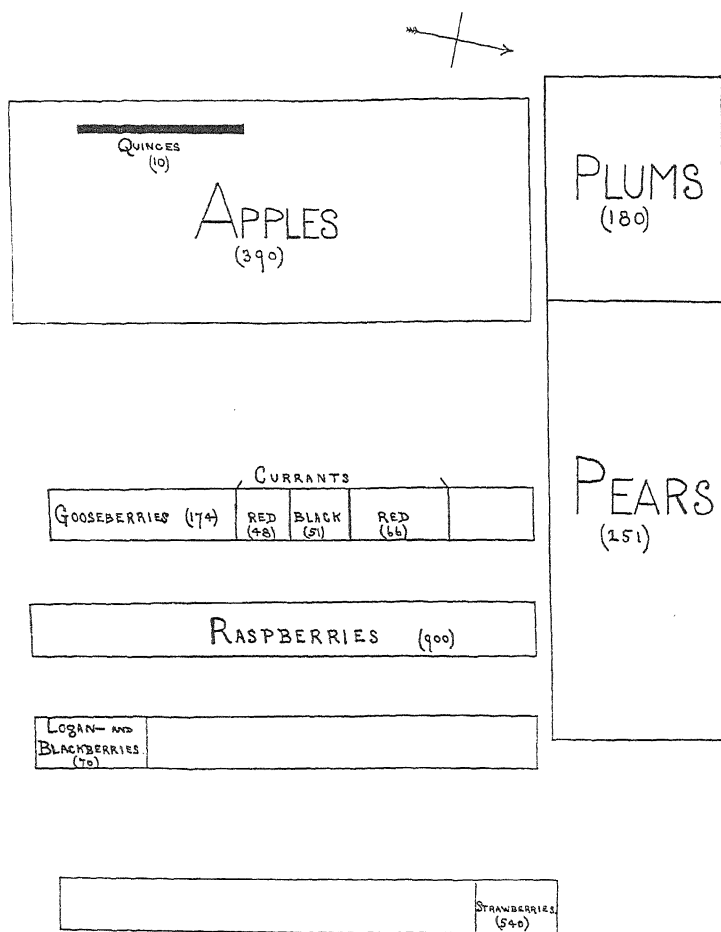


FIG. 60.—PLAN OF PART OF FRUIT PLANTATION AT WISLEY, WHERE THE OBSERVATIONS WERE MADE.

## ORDER LEPIDOPTERA.

*Rhopalocera*.—Butterflies are adapted to a nectar diet by reason of their elongated proboscis, and can obtain this food from many flowers inaccessible to other insects. Rosaceous flowers with their shallow corolla are not true butterfly flowers, although apples and plums are sometimes visited by the peacock, *Vanessa io* L., and the small cabbage white, *Pieris rapae* L., whilst strawberry flowers were often visited by the latter species. They cannot be classed as useful pollinating agents, for little pollen is carried by them. They are seen to stand on the petals and thrust their proboscis down into the nectaries, and rarely come in contact with the stamens. Hibernated specimens of the peacock emerge during warm days in early spring, when they can be seen on plum flowers, the earliest record at Wisley being March 30, 1920.

The cabbage white is a flitter, and its habits are such that little time is taken on each flower. Several specimens were taken on apple flowers at various times, especially in 1922, and on strawberry (1923).

The only other butterfly taken on apple flowers was the common blue, *Lycaena icarus* Rott.

*Heterocera*.—This large sub-order comprises the moths, of which there are over 1,200 British species. A few of them are diurnal in their habits, most of them being crepuscular and nocturnal. They visit flowers for the purpose of obtaining nectar, but those of fruit trees are not favoured with their visits. The only species taken at Wisley are :

Three *Anarta myrtilli* L. on red currants (May 18, 1924, between 3.10 P.M. and 3.35 P.M.).

Two *Monima gracilis* F. on plums (May 5, 1922, between 8.40 P.M. and 9 P.M.).

One *Eupithecia* species on gooseberries (April 11, 1923, 12.50 P.M.).

Mr. RICHARD SOUTH tells me that he has found most of the *Taenio-campa* (*Monima*) visit plum and damson blossoms, but especially *T. gracilis* F., which is a later species than the other sallow catkin-loving member of the genus.

The fruit plantations at Wisley and elsewhere have been examined at various times between 8 P.M. and 1 A.M., but no moths have been seen on the flowers. The above records represent the total number of moths taken on fruit flowers over a period of six years (1920-1925 inclusive).

It is not uncommon to find the larvæ of winter (*Cheimatobia brumata* L.) and green pug (*Chloroclystis rectangulata* L.) moths in the flowers of apple and quince, which they destroy, and these cannot be considered as useful additions to the list of fruit pollinators.

## ARACHNIDA.

Spiders do not visit flowers for any other purpose than the capture of prey. Three species of web-spinning spiders have been taken on

apple and plum flowers and one species on most of the other fruits. They spin webs round the blossom clusters, and in so doing capture many pollinating insects, chiefly small flies (*Anthomyiids* and *Sciara*). They work by night as well as by day, and probably convey a certain amount of pollen whilst constructing their webs.

#### INSECTS GENERALLY.

The pollinating agents of fruit flowers have been considered by HOOPER\* and the Wisley observers† in general terms, and it was considered necessary to carry observations over long periods, in order to arrive at definite conclusions as to what insects may be considered essential. The district and position of orchards govern to a large extent the numbers of wild insects, and the plantations at Wisley are favoured by reason of their close proximity to open country and pasture land.

The difficulty arises where large areas of fruit are grown, and also in the case of isolated trees in town gardens, where the number of wild insects is reduced. It has already been suggested that hive bees should be introduced into those situations where pollination cannot be carried out through the agency of humble and wild bees and other insects.

The planting of shelter belts round fruit plantations plays an important part in the encouragement of pollinating insects, many of which do not venture far during windy weather. It has been observed that most insects prefer to work on the leeward side of trees and also choose the sunny side, especially the sun-loving hive bees, *Andrenas*, and hover flies. Even a temporary absence of sun through the presence of clouds will cause a falling off in their numbers.

It has often been observed that trees on the outside of a plantation receive fewer insect visitors than those on the inside; this was specially noticeable on windy days, when the air within the plantation was comparatively quiet and less disturbed.

Some of the first records to be made in this country on the self-sterility of fruit trees ‡ stated that the amount of fruit diminished towards the centre of the plantation, due to the absence of foreign pollen and not to the fact that fewer insects were found there.

A large number of insects that visit flowers are pests; amongst many such unwanted visitors mention may be made of thrips, aphides, ants, moth larvæ, chafers, apple blossom and leaf weevils, and sawflies.

Dr. DURHAM§ raised the question of night pollinators, and suggested that moths, ants, and spiders may contribute their quota. As far as the Wisley observations go, there is no evidence to bear out the suggestion that night-flying moths or nocturnally active insects play any serious part in the pollination of fruit blossoms, for the only insects that were observed to visit fruit flowers after dark were one species of moth (on

\* HOOPER, C. H., *Jour. Pomology*, vol. 1. No. 2, pp. 116-124.

† RAWES, A. N., and FOX WILSON, G., *R.H.S. Jour.*, 47, pp. 15-17.

‡ CHITTENDEN, J. F., *R.H.S. Jour.*, 27 (1902), p. cxc.

§ DURHAM, Dr., *Gard. Chron.*, Aug. 6, 1921, p. 78.



plums), some ants and earwigs, with an occasional spider, none of which possess sufficiently industrious habits to warrant their inclusion as pollinators.

The number of insects intent on obtaining nectar and pollen at a given time on a tree is often very large; as many as fifty-four individual insects have been counted on one bush apple (April 28, 1921) and sixty-eight on a bush pear (May 9, 1922) in the space of two minutes. It is not unusual to find a tree, which is swarming with insects at one moment, become in the course of a few minutes almost deserted without any apparent reason—the temperature and other factors remaining the same.

Table VII. gives a census of the chief pollinators of the various fruits.

I wish to tender my sincere thanks to the Director for suggesting the research in 1920; also to Mr. F. W. EDWARDS, M.A. (British Museum) and Mr. E. B. NEVINSON (Cobham) for so kindly identifying the flies and bees respectively, and to Mr. N. K. GOULD for taking the photographs.

TABLE VII.

*Census of Chief Pollinating Agents to Fruit Trees at Wisley, Surrey.*

		1920. April 12- May 1 12h. 40m.	1921. April 8- May 13 12h. 25m.	1922. May 9-26 7h. 15m.	1923. April 23- May 13 5h. 10m.	1924. May 14-17 1h. 15m.
I. APPLE.						
Hymenoptera	Species Represented.					
Hive Bees . . .	2	—	85	74	48	15
Humble Bees . . .	5	103	134	55	55	10
Wild Bees . . .	10	10	30	41	16	9
Wasps . . .	5	5	1	8	—	1
Ants . . .	1	—	—	1	2	—
Sawflies . . .	1	1	8	11	—	—
Others . . .	3	—	1	4	1	—
Diptera						
Hover Flies—Eristalis.	5	13	51	13	1	9
"    "    Syrphus.	4	1	84	33	20	—
Fever Flies—Bibio . .	4	—	8	13	1	—
Midges—Sciara . . .	4	96	Too numerous to count			
Anthomyiids . . .	2	27	30	23	26	19
Bluebottles and Green- bottles . . .	3	8	11	28	14	3
Other Flies. . .	20	18	17	12	4	1
Coleoptera						
Ladybirds . . .	4	5	4	6	1	—
Other Beetles . . .	18	4	26	21	—	12
Lepidoptera						
Butterflies and Moths .	4	—	3	5	5	—
Moth Caterpillars . .	2	3	1	—	—	1
Neuroptera						
Stone Flies, etc. . .	2	—	—	3	1	—
Rhynchota						
Bugs and Aphides . .	3	2	—	—	—	1
Thysanoptera						
Thrips . . .	2	2	5	4	7	—
Arachnids						
Spiders . . .	3	3	3	1	—	1

## II. PEAR.

					1920. March 25- April 13 2h. 55m.	1921. March 7- April 14 8h. 35m.	1922. April 21- May 14 10h. 20m.	1924. April 25- May 11 1h. 20m.
Species Represented.								
<b>Hymenoptera</b>								
Hive Bees	.	.	.	2	—	41	89	1
Humble Bees	.	.	.	3	14	44	69	8
Wild Bees	.	.	.	7	—	42	62	—
Wasps	.	.	.	2	—	1	2	—
Ants	.	.	.	1	—	—	1	1
Others	.	.	.	1	—	—	1	—
<b>Diptera</b>								
Hover Flies—Eristalis	.	.	.	3	1	53	34	1
" " Syrphus	.	.	.	4	5	19	24	—
Fever Flies	.	.	.	2	—	1	1	—
Midges—Sciara	.	.	.	3	Too numerous to record			
Anthomyiids	.	.	.	4	16	25	33	4
Bluebottles	.	.	.	3	5	11	32	6
Other Flies	.	.	.	5	25	14	1	—
<b>Coleoptera</b>								
Ladybirds	.	.	.	2	4	1	8	—
Other Beetles	.	.	.	7	1	1	6	—
<b>Thysanoptera</b>								
Thrips	.	.	.	2	3	1	1	4
<b>Arachnids</b>								
Spiders	.	.	.	3	6	1	2	—

## III. PLUM.

					1920. March 25- April 8 3h.	1921. March 10- April 13 3h. 23m.	1922. April 21- May 9 9h. 40m.	1923. March 26- April 24 8h. 15m.
Species Represented.								
<b>Hymenoptera</b>								
Hive Bees	.	.	.	2	—	15	18	6
Humble Bees	.	.	.	3	34	56	135	83
Wild Bees	.	.	.	8	—	21	46	23
Wasps	.	.	.	3	—	—	3	1
Ants	.	.	.	1	—	1	1	—
Others	.	.	.	1	—	—	1	1
<b>Diptera</b>								
Hover Flies—Eristalis	.	.	.	5	—	32	19	11
" " Syrphus	.	.	.	2	1	12	12	2
Midges—Sciara	.	.	.	3	Several	Numerous	Very Numerous	
Anthomyiids	.	.	.	4	4	7	21	15
Bluebottles and Greenbottles	.	.	.	3	2	15	33	18
Dung Flies—Scatophaga	.	.	.	1	1	11	4	7
<b>Coleoptera</b>								
Ladybirds	.	.	.	2	4	1	4	—
Other Beetles	.	.	.	2	1	1	—	1
<b>Lepidoptera</b>								
Butterflies	.	.	.	2	1	—	1	—
<b>Rhynchota</b>								
Aphides	.	.	.	1	—	2	—	—
<b>Orthoptera</b>								
Earwigs	.	.	.	1	—	—	—	2
<b>Arachnids</b>								
Spiders	.	.	.	1	1	1	—	—

## IV. CHERRY.

						1922. May 8-9 rh.	1923. April 18- May 14 rh. 35m.	1924. May 14 30m.
						Species Represented.		
<b>Hymenoptera</b>								
Hive Bees	.	.	.	.	.	2	4	5
Humble Bees	.	.	.	.	.	5	9	3
Wild Bees	.	.	.	.	.	4	8	—
Wasps	.	.	.	.	.	3	2	—
Ants	.	.	.	.	.	1	1	1

**Diptera**

Hover Flies—Eristalis	.	.	.	.	.	3	1	2	1
" " Syrphus	.	.	.	.	.	3	2	1	—
Midges—Sciara	.	.	.	.	.	2	Several	Several	Several
Anthomyiids	.	.	.	.	.	1	—	2	1
Bluebottles	.	.	.	.	.	1	5	2	—

**Coleoptera**

Ladybirds	.	.	.	.	.	2	1	—	1
Other Beetles	.	.	.	.	.	1	1	—	—

**Lepidoptera**

Butterflies	.	.	.	.	.	1	1	1	—
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## V. QUINCE.

V. QUINCE.							1922. May 20 30m.	1924. May 18-20 45m.	
Hymenoptera							Species Represented.		
Hive Bees	.	.	.	.	.	.	2	5	4
Humble Bees	.	.	.	.	.	.	3	8	7
Wild Bees	.	.	.	.	.	.	2	3	—
Wasps	.	.	.	.	.	.	1	1	—

**Diptera**

Hover Flies—Eristalis	.	.	.	.	.	1	1	—
" " Syrphus	.	.	.	.	.	1	3	3
Midges—Sciara	.	.	.	.	.	1	Numerous	
Anthomyiids	.	.	.	.	.	2	6	10
Bluebottles and Greenbottles	.	.	.	.	.	2	2	2

**Coleoptera**

Ladybirds	.	.	.	.	.	2	3	1
Other Beetles	.	.	.	.	.	4	3	7

**Lepidoptera**

Moth Caterpillars	.	.	.	.	.	1	4	1
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## VI. RASPBERRY.

VI. RASPBERRY.							1923. June 6- July 1 45m.	1924. June 11-19 rh. 30m.	
Hymenoptera							Species Represented.		
Hive Bees .	.	.	.	.	.	.	2	4	9
Humble Bees .	.	.	.	.	.	.	6	13	19
Wild Bees .	.	.	.	.	.	.	10	6	7

**Diptera**

Hover Flies—Eristalis	.	.	.	.	.	2	1	3
" " Syrphus	.	.	.	.	.	3	2	2
Anthomyiids	.	.	.	.	.	2	1	1
Other Flies	.	.	.	.	.	4	5	3

**Coleoptera**

Ladybirds	.	.	.	.	.	1	1	—
Other Beetles	.	.	.	.	.	2	1	1

**Lepidoptera**

Moths	.	.	.	.	.	1	—	1
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**Rhynchota**

Bugs	.	.	.	.	.	1	1	1
Aphides	.	.	.	.	.	1	—	2



## X. RED AND WHITE CURRANTS.

					1920. April 8 10m.	1922. April 28— May 9 50m.	1923. April 11—26 1h. 55m.	1924. April 28— May 18 2h. 25m
					Species Represented.			
<b>Hymenoptera</b>								
Hive Bees	.	.	.	.	2	—	4	2
Humble Bees	.	.	.	.	3	3	5	2
Wild Bees	.	.	.	.	8	—	3	30
Wasps	.	.	.	.	3	—	1	—
Ants	.	.	.	.	1	1	—	—
Sawflies	.	.	.	.	1	—	1	2
<b>Diptera</b>								
Hover Flies—Eristalis	.	.	.	.	3	—	—	4
" " Syrphus	.	.	.	.	2	1	5	5
Midges—Sciara	.	.	.	.	2	—	—	—
Fever Flies—Bibio	.	.	.	.	2	—	—	4
Dung Flies—Scatophaga	.	.	.	.	1	—	—	1
Anthomyiids	.	.	.	.	3	1	7	13
Bluebottles	.	.	.	.	1	—	2	8
<b>Coleoptera</b>								
Ladybirds	.	.	.	.	3	—	2	5
Other Beetles	.	.	.	.	3	—	1	3
<b>Lepidoptera</b>								
Moths	.	.	.	.	1	—	—	3
<b>Rhynchota</b>								
Plant Bugs	.	.	.	.	1	—	—	—
Aphides	.	.	.	.	1	—	—	2
<b>Arachnids</b>								
Spiders	.	.	.	.	1	—	—	1

## XI. GOOSEBERRY.

					1920. April 8. 10 mins.	1922 April 28— May 9 55 mins.	1923. April 9—26 3h. 20m.	1924. April 24— May 11 1h.
					Species Represented.			
<b>Hymenoptera</b>								
Hive Bees	.	.	.	.	2	—	3	2
Humble Bees	.	.	.	.	4	1	4	9
Wild Bees	.	.	.	.	3	—	—	1
Wasps	.	.	.	.	2	—	1	1
Ants	.	.	.	.	1	1	—	—
Sawflies	.	.	.	.	1	—	3	1
<b>Diptera</b>								
Hover Flies—Syrphus	.	.	.	.	2	—	3	—
Midges—Sciara	.	.	.	.	1	—	—	—
Scatophaga	.	.	.	.	1	Few	Several	Several
Anthomyiids	.	.	.	.	2	5	6	1
Bluebottles	.	.	.	.	1	2	3	1
Other Flies	.	.	.	.	2	1	3	1
<b>Coleoptera</b>								
Ladybirds	.	.	.	.	3	—	2	—
Other Beetles	.	.	.	.	1	—	1	—
<b>Lepidoptera</b>								
Moths	.	.	.	.	1	—	—	1
<b>Rhynchota</b>								
Aphides	.	.	.	.	1	—	—	1
<b>Arachnids</b>								
Spiders	.	.	.	.	1	—	—	2

## CONTRIBUTIONS FROM THE WISLEY LABORATORY.

XLVIII.—A BLOSSOM WILT AND STEM ROT OF CULTIVATED ANTIRRHINUMS AND SCHIZANTHUS DUE TO SCLEROTINIA SCLEROTIORUM (*Lib.*) *Massee*.

By W. J. DOWSON, M.A., F.L.S. (Mycologist).

At the November meeting of the British Mycological Society in 1923 a short paper was read on a disease of cultivated Antirrhinums which had occurred at Wisley in the previous year. A summary of this communication was published subsequently in the *Gardeners' Chronicle*.\* The present account deals at greater length with the same disease and embodies the results of further investigation since 1923, particularly as regards the infection of the flowers.

1. *Occurrence and Appearance of the Disease.*

During the first week of June, 1922, the Director drew my attention to the condition of some Antirrhinums among a large number flowering under glass at Wisley. Five plants, all of the same white variety, were dying off and wilting at the tops.

The tops of the flowering stems bore unexpanded buds, and it was the wilting and bending over of these which first drew attention to the diseased plants. A few days later about ten more plants, not of the same variety, in different parts of the house, were found to be in a similar condition.

All the diseased plants were removed from the trial house and placed in the experimental house for further observation. Each one was at the same stage of development—that is, not quite in full flower—and each presented a similar appearance as regards the diseased portions. A number of the flowers at the base of the inflorescence had withered up with the remains of the corollas hanging down. Their peduncles, and the axis from which they sprang, were also withered and of a remarkable whiteness in hue. The pallor of the floral axis extended for some distance below and above the withered flowers. The boundary between the shrivelled pallid portion and the rest of the stem was marked by a pronounced green zone having a watery appearance and being much darker in shade than the normal green of the stems. This zone was most noticeable in varieties bearing dark-coloured blossoms, and was not so apparent on the white-flowered varieties, the more hairy stems of which tended to mask the contrast in colour. The uppermost parts of the flower spikes bearing flower

\* Dowson, W. J., "A Flower-spike Disease of Cultivated Antirrhinums," *Gard. Chron.*, 75 (1924), p. 62.



FIG. 61.—DISEASED ANTIRRHINUM, SHOWING WILTED TERMINAL FLOWER BUDS AND WHITE PARTS OF AXIS.



FIG. 62.—THICK PARALLEL HYALINE IN CORTEX OF DISEASED ANTIRRHINUM.  
(Stained with Congo red. Photomicrograph.)

[To face p. 253.]



buds were evidently suffering from an interference of the water supply, as they were wilted and hung over (fig. 61). The wilted portions never recovered and no capsules developed in any flower of the diseased inflorescences. The damage to the flowering axis spread slowly downwards, involving the main stem of the plants and the lateral shoots, commencing at the youngest, until the greater portion of the plants above soil level withered and took on the same white appearance so noticeable in the diseased inflorescences.

In most of the plants under observation the disease appeared to be arrested just above the soil level, but in a few the roots were also killed.

On some of these plants, but not on all, a few nearly spherical, black, resting-bodies (sclerotia) were formed near ground level and on the outside of the stems just beneath the insertion of the lateral shoots. Inside the whitened dead stems and branches more black sclerotia were found, elongated in shape and occupying the pith cavity.

After cutting off some of the diseased inflorescences well below the watery dark green zone, what was left of the plants remained healthy and bore flowers followed by capsules on the lateral shoots. Unless the diseased parts were removed the plants were rapidly killed, at least to ground level, and were useless for cut flowers or for seed purposes.

## 2. *Isolation of a Sclerotium-forming Fungus.*

Large septate hyphæ were found in the cortical tissues. Microscopic preparations of the dark green zone showed the advancing edge of the mycelium to consist of numerous and very thick hyphæ growing parallel to one another, just beneath the epidermal cells. Behind this margin, hyphæ were found in the deeper layers of the cortex, and still farther back all the stem tissues were invaded. Fig. 62 is a photomicrograph of a portion of the cortex taken from the main stem of a diseased *Antirrhinum* showing the mat of parallel hyphæ, and fig. 63 is a small portion of this drawn with the aid of the camera lucida. The thickest hyphæ measure as much as  $25\mu$  across. Pieces of such tissue and also portions of the dead stems placed in petri-dishes containing potato-broth agar within twenty-four hours had produced copious white fluffy mycelium surrounding each piece of diseased plant tissue.

From these dishes the mycelium was easily obtained in pure culture and grown on various media such as steamed potato plugs, damp blotting paper, and Dox's agar contained in either petri-dishes or in tubes.

After a few days the surfaces of these media were covered with white fluffy mycelium, which then commenced to form solid sclerotia (resting bodies), at first white and finally black, bearing beads of liquid.

These sclerotia corresponded in size and appearance with those already produced on and in the dead stems of the diseased plants

mentioned above. Those produced in the pure cultures varied considerably in size and measured from 1 mm. to 4 mm. across (see fig. 64). The formation and size of these bodies appeared to be closely related to the amount of moisture present, about which more will be said later. No other fructifications of any sort were ever formed in these or any subsequent pure cultures which consisted of mycelium and sclerotia.

### 3. *Production of Apothecia from the Sclerotia.*

The general appearance of the disease, considered together with the nature of the mycelium, particularly the formation of sclerotia which did not produce *Botrytis* fructifications when kept moist, suggested very strongly that the mycelium isolated from the diseased *Antirrhinums* belonged to the fungus *Sclerotinia sclerotiorum* (Lib.) Mass.

It is well known that this fungus will attack a large number of plants of horticultural interest, and at Wisley it had been previously encountered upon dahlias and tomatos. At the time the *Antirrhinums* were attacked, dwarf French beans on a neighbouring farm were discovered to be suffering from a very similar disease in which large round sclerotia were formed. The identity of the *Antirrhinum* fungus could not be confirmed unless and until the sclerotia gave rise to the well-known cup-shaped apothecia (fructifications) of the *sclerotinia*. With this object in view all the available sclerotia were collected from diseased plants and from pure cultures, amounting to about a dozen in all. In addition to these a few sclerotia from the diseased beans mentioned above were also gathered, and the three lots were lightly buried in sand contained in three small pots which were placed in the frame yard to pass the winter outside.

In the first week of May, 1923, the first signs of apothecial development appeared in the form of slender, light brown stalks arising above the level of the sand in which the sclerotia had been buried the previous September. Several apothecial stalks were produced by the largest sclerotia, but the smaller ones only gave rise to one or two. Development was rapid, and the swelling at the tips became enlarged in a few days into small wine-glass-shaped fructifications. A week after its emergence from the sand the first apothecium appeared to be mature, for when lightly tapped a small cloud of spores was discharged from the now expanded funnel-shaped body. It then measured about  $\frac{1}{4}$  inch across, was borne upon a short ( $\frac{3}{16}$  inch) tapering neck connecting it with the sclerotium, and in colour corresponded with the *cinnamon* of Ridgway's "Colour Standards and Nomenclature" (fig. 65).

By teasing apart in water a small portion of the hymenium of apothecia which had commenced to discharge ascospores, asci were observed to be present in various stages of development. The fully formed ascospores either occupied slightly more than the upper half of an ascus and were surrounded by unvacuolated cytoplasm which

extended to the base of each ascus (fig. 66), or the eight spores took up rather less than the upper half of an ascus and were not embedded in cytoplasm of which only a little remained in the lower portion of the asci (fig. 66). WORMALD \* observed and figured similar but more exaggerated conditions in the asci of *Sclerotinia cinerea* and *Sclerotinia Mespili* respectively, in which he made out three distinct stages just before the discharge of each ascus.

#### 4. Infection Experiments.

##### (i) With Mycelium in 1922.

In July and August, 1922, it was decided to try inoculating *Antirrhinum*s with pure cultures of the isolated mycelium.

This was introduced into incisions, some slight, others deep (to the pith), in the stems just below the oldest flowers of a number of plants. After inoculation the wounds were bound round with strips of tinfoil secured by the string of a small label. The plants were then set upon a bench of the experimental house, the atmosphere of which was kept rather dry.

The inoculated plants comprised different coloured varieties, some pure white, like those in which the disease was first observed, some pale yellow, some pink, and others dark crimson.

The white and pale-coloured varieties inoculated through deep wounds showed signs of infection after six or seven days, when a dark green zone appeared on the stem both above and below the tinfoil wrappings. The advancing dark green zone was rapidly followed by a shrivelling of the infected portion, which subsequently took on the pallid colour characteristic of the original plants. The disease spread in both directions, but more rapidly downwards than upwards, and came to a standstill some distance above ground level. The top of the inflorescences wilted and hung over just as in the diseased plants first observed.

The inoculations into slight incisions were only partially successful in these plants and failed altogether in the crimson-coloured varieties. A few of the latter were, however, infected through the deep incisions, but even so the diseased portions were limited to about 3 inches. As far as the effect upon the stem was concerned the darker-flowered varieties seemed far more resistant than the white or paler kinds. Out of twenty-nine plants so inoculated sixteen were definitely infected. The failure to produce more infections was very probably connected with the comparatively dry atmosphere under which the inoculations were performed. It is certainly noteworthy that where the inoculum was introduced deep into the tissues, where it would be likely to remain moist for a longer time than in the slight incisions, infection resulted more frequently.

From one of the artificially infected plants the mycelium was reisolated and grown in pure cultures, which later produced sclerotia.

An attempt was also made in 1922 to infect the flowers with the mycelium, as it was possible to point to one particular flower of the original diseased inflorescences which seemed to be in a worse state than the rest, suggesting that infection might have taken place at that flower. Mycelium introduced into the corollas of a number of flowers on different plants produced no effect. But if the corollas were torn, or removed altogether and the ovary wounded by pricking with a hot needle, or if the very young capsules were so treated and then covered with a quantity of agar and mycelium, infection of the rest of the flower and its peduncle followed in about ten days. Out of eight such inoculations two only were failures.

##### (ii) With Ascospores in 1923.

In May and June, 1923, when, as mentioned above, several apothecia were discharging ascospores, many successful infections were made by inoculating the flowers, and as this appears to be the first record of such a mode of infection for the fungus *Sclerotinia sclerotiorum* the evidence upon which this is based may be given in some detail.

\* WORMALD, H., "On the Occurrence in Britain of the Ascigerous Stage of a 'Brown Rot' Fungus," *Ann. Bot.*, 35 (1921); "Observations on a Discomycete found on Medlar Fruits," *Trans. Brit. Myc. Soc.*, 7 (1922).

On May 9, 1923, the anthers of four white flowers on one spike were removed with the aid of a pair of forceps, and with a fine camel-hair brush ascospores were transferred from a mature apothecium to the stigmas of these flowers. Each inoculated flower was then marked by a small label tied round its peduncle.

On the 16th, i.e. seven days later, the corollas of three of the inoculated flowers had fallen off and lay on the soil beneath, where they remained turgid for some time. On the 18th—nine days after inoculation—the styles of these three flowers were hanging down limp (see fig. 67). By the 22nd the peduncles had become infected and also a portion of the axis, which had turned grey in colour.

On May 22 the stigmas of ten emasculated flowers on a number of plants were inoculated in the same way with ascospores derived from an apothecium arising from one of the dwarf bean sclerotia. On the 24th three more flowers on three different plants were inoculated in the same manner and from the same source. In both these experiments, exactly nine days after inoculation the drooping of the stigmas of most of these flowers occurred, followed by the invasion of the peduncles and finally the flowering axis.

All the above may be termed stylar infections. In none of them was the resulting disease so severe as in the original plants in 1922. No plant was killed to ground level, and the advance of the mycelium seemed to be arrested after about 10 inches of the flowering axis had been killed and turned greyish white. Furthermore, sclerotia were not formed in or on these plants. No evidence of a greater resistance to attack in crimson flowers was noted in these experiments.

The failure to do more damage to the inoculated plants and to form sclerotia may be attributed to the comparative dryness of the atmosphere in which the plants were growing. Instead of being close together, as were the plants of the 1922 trial, the experimental plants of 1923 were relatively few in number and were spaced widely apart, so that ventilation was a great deal better than in the trial. In other words, the atmosphere round the experimental plants of 1923 was fresher and dryer in comparison with that of the crowded plants of 1922.

In October, 1923, several more sclerotia were buried in sand and kept out of doors as before, so as to provide ascospores for the 1924 infection experiments. The sclerotia were derived from several sources: (1) pure cultures of the mycelium originally isolated in 1922 (mycelium isolation), (2) pure cultures of the mycelium arising from isolated ascospores (ascospore isolation), (3) sclerotia from dwarf beans and now a year old, (4) from diseased carrots kindly provided by Mr. F. T. Brooks from Cambridge, and (5) from the interior of stems of *Cheiranthus Allionii*, some plants of which seemed to have been killed by a similar disease in a garden at Guildford in June, 1923.

On April 24, 1924, the first young apothecium to make its appearance arose from the *Cheiranthus* sclerotia, followed in the first week of May by young apothecia from sclerotia derived from *Antirrhinum* and carrots. The bean sclerotia did not produce fructifications, so that in this instance the sclerotia had not survived keeping in the laboratory for one year. On May 5 one of the *Antirrhinum* apothecia appeared to be fully formed, and from this a suspension of ascospores in a little tap water was made by means of a camel-hair brush. Examined under the microscope the liquid was seen to contain many ascospores, a few undischarged asci, bacteria, and a few unicellular green algæ (probably *Chlamydomonas* sp.).

### (iii) With Ascospores in 1924.

On May 5, 1924, two plants of the same variety ('Queen of the North'), which had white corollas with a sulphur-yellow lip, were selected for inoculation, on account of their large flowering axes bearing numerous flowers, the lowermost of which were fully open. The eight oldest flowers of one, and the four oldest of the other, were emasculated: these twelve flowers and also the fifth flower on the second plant were all inoculated with ascospores. The additional flower was the only one not emasculated.

The pots were laid on their sides, so that the inflorescences extended horizontally with the flowers to be inoculated pointing upwards. Then by pinching the throats of the corollas the lips gaped apart, exposing the interior, and into this a small brush charged with a suspension of ascospores was inserted. By gently stroking the stigmas a drop of liquid was lodged on its surface, but in doing so smaller drops of the liquid were splashed onto the sides of the corolla in some of the flowers. After treating one flower the pot was rolled over a little so as to bring the next flower into a vertical position.

On May 12, i.e. after seven days, three corollas of the first plant had fallen off, exposing the styles, which were hanging down slightly and were paler in colour than those of untreated flowers.

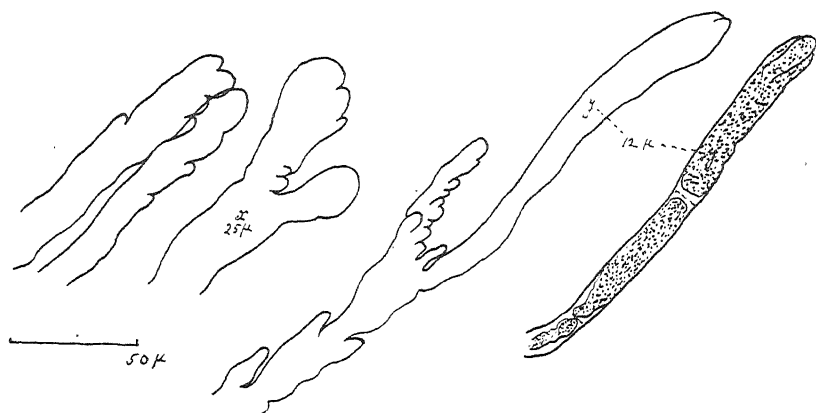


FIG. 63.—THICK HYPHÆ FROM CORTEX OF DISEASED ANTIRRHINUM.  
(Camera lucida drawing.)

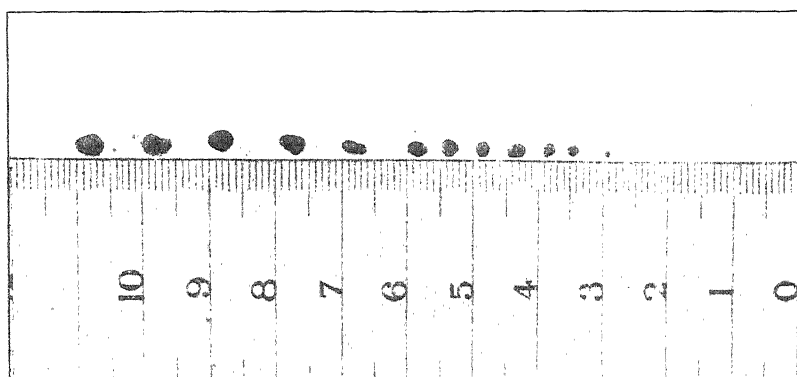


FIG. 64.—SCLEROTIA OF FUNGUS OF ANTIRRHINUM WILT FROM PURE CULTURES  
(The scale shows size in millimetres.)

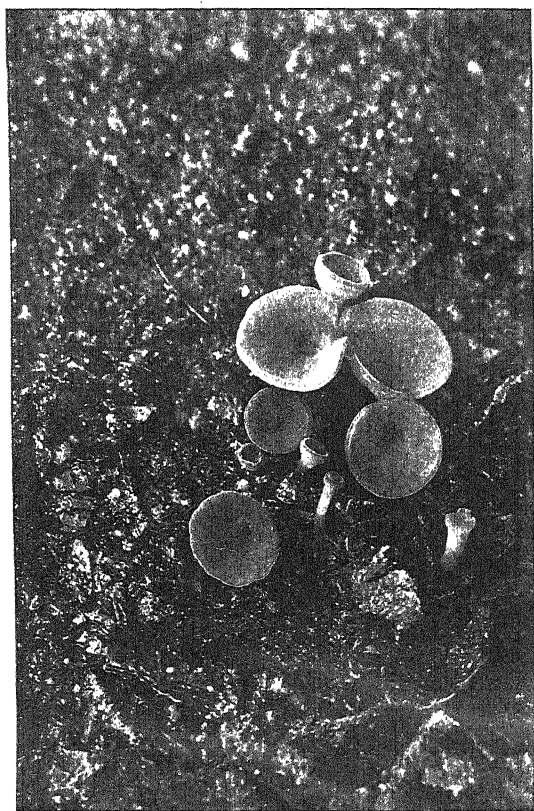


FIG. 65—APOTHECIA OF *SCLEROTINIA SCLEROTIORUM* FROM *SCLEROTIA* BURIED EIGHT MONTHS IN SAND AND KEPT OUTDOORS.  $\times 3$ .

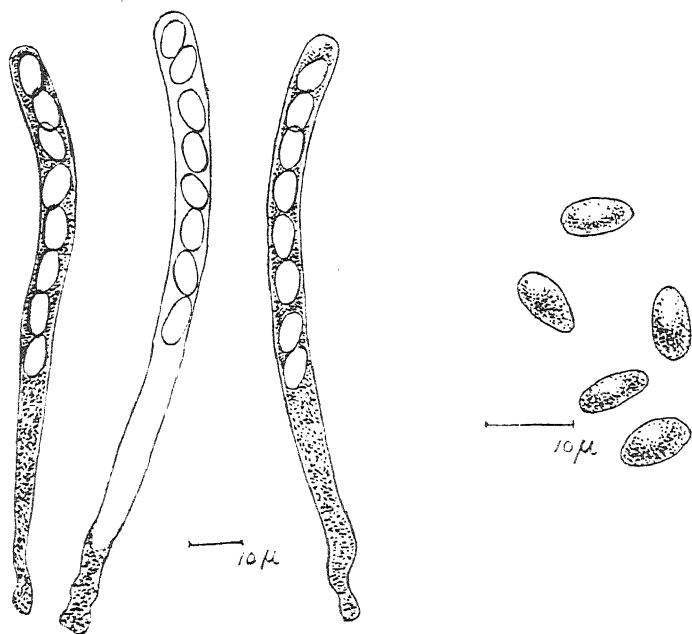


FIG. 66.—ASCI WITH MATURE ASCOSPORES OF *SCLEROTINIA SCLEROTIORUM*.  
SPORES ON RIGHT MORE ENLARGED.

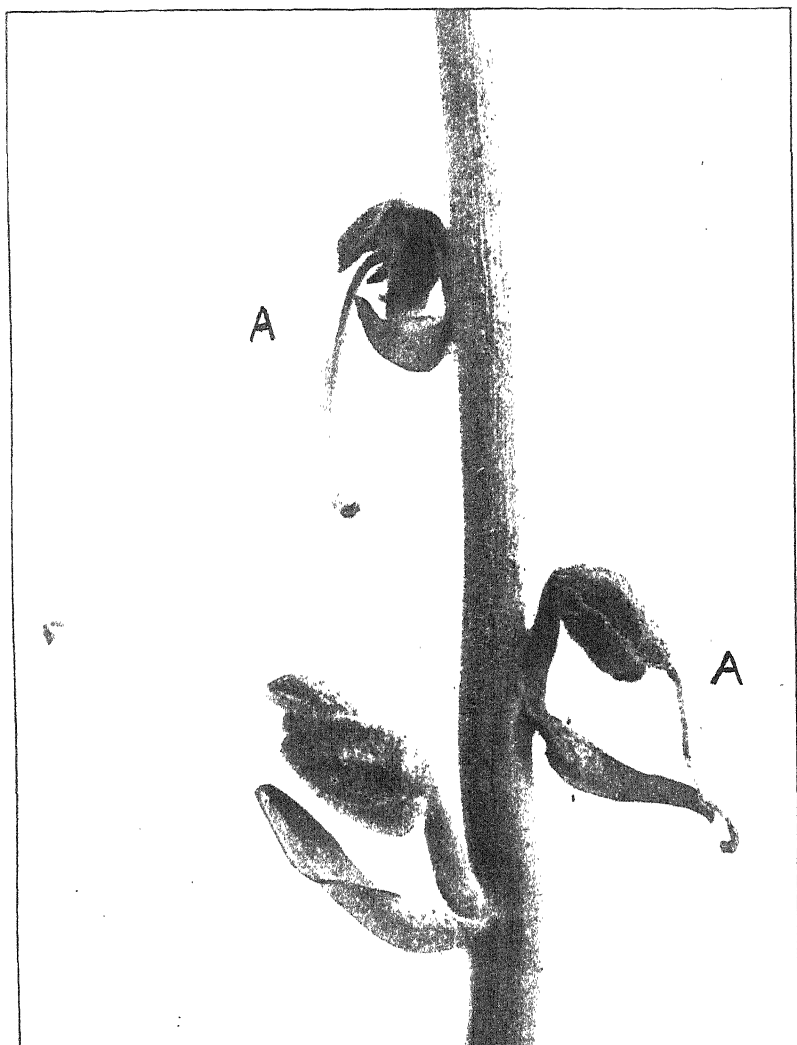


FIG. 67 —PART OF INFLORESCENCE OF ANTIRRHINUM, SHOWING TWO STYLAR INFECTIONS, AA.  $\times 2$ .

[To face p. 257.]



On the following day four corollas of the four inoculated flowers had dropped from the second plant, but the corolla itself of the fifth—that last inoculated and not emasculated—had collapsed and was hanging down crumpled and wilted. Moreover, the *base* of the calyx of this particular flower appeared greyish green and not bright green as did all the others. On removing the collapsed corolla the style was found to be still unaffected and was turgid and normal in appearance, though slightly bent over by the weight of the dying corolla.

In this instance the corolla with the anthers and the calyx had been infected first and not the stigma and style. On the same date an inoculated flower on the other plant exhibited similar symptoms with collapsed corolla and greyish-green calyx (fig. 68). Hence there appeared to be *two* modes of infection via the flowers, one, so far the commonest, via the stigma and style (no anthers being present), and the other via the corolla with the anthers and the base of the calyx, which may be termed corolla infections.

On the 20th the condition of the first plant (with eight inoculated flowers) was as follows: flowers 1, 3, and 5 showed styler infections, the corollas having dropped off. The styles were hanging down, were limp, pale straw coloured and exuding drops of liquid. The calyces were still green. The eighth flower showed an infection through the corolla. The other inoculated flowers did not appear to be infected.

The condition of the second plant with five inoculated flowers was: the fifth flower showed corolla infection, flowers 2 and 3 styler infections, and flowers 1 and 4 were not infected.

On May 7, 1924, four flowers of a plant were emasculated and inoculated in the same way as before; on the 14th the corolla of the second flower had fallen off, exposing a style limp and hanging down; on the 20th the condition of this plant was as follows: the lowest flower showed the corolla type of infection, the second and third flowers exhibited styler infections, and the fourth did not seem to be infected.

On May 8, 1924, another plant with purple flowers was chosen. The four lowest flowers were inoculated as before, but were not emasculated. On the 16th the corolla of the lowest flower had fallen off, but its style appeared to be still healthy; the next flower showed no sign of infection, neither did the fourth; but the corolla of the third flower had just commenced to collapse. It had tilted over slightly into a horizontal position, with both lips crumpled and wilted, though the basal portion was still turgid. By separating the wilted lips with forceps the interior could be seen. The style was found to be normal and as yet not infected, but the anthers appeared to be involved in the disorganization of the corolla.

On the following day the corolla had entirely collapsed, one of the sepals had changed in colour from green to grey, and on tearing apart the remains of the corolla, so as to see the conditions of the ovary and style, it was found that the former had now become infected. It was pale green in colour and soft to the touch. The *base* of the style had become involved so that the distal portion was now hanging vertical, although still turgid. In this particular inoculation, then, the mycelium had attacked the corolla tissues close to the lips, had travelled rapidly towards the base from which the calyx and peduncle became infected, then to the ovary, and finally to the style *from the base to the stigma*.

This flower with its subtending bract was next removed from the plant and transferred to a large petri-dish containing a sheet of moist filter paper. In a few days all the tissues became covered with a fluffy white mycelium from which a few large sclerotia were finally produced (fig. 69).

In collaboration with Mr. G. Fox WILSON, entomologist, an attempt was made to bring about the infection of the flowers with the aid of humble bees (*Bombus lucorum* Smith, *B. agrorum* Fab., and *B. lapidarius* Linn. ♀♀). Six small *Antirrhinum* plants in flower (some white and others coloured) were placed in a cage about 2½ feet square, the sides of which were composed of glass and wire gauze. In one experiment a small pot containing mature apothecia was placed in the cage amongst the plants. Bees caught at 1.30 P.M. on June 8, 1924, were introduced at 1.45 P.M. into the cage in the hope that some of the discharged ascospores might alight on the insects' backs and so be conveyed to the flowers. In a second experiment, on June 10, the bees were actually dusted with spores by means of a fine brush, and then introduced. In both attempts the bees were erratic in their flight and buzzed about the cage without settling on the flowers for some considerable time. Eventually some of the flowers were visited, but no infection resulted in either experiment.

On June 6, 1924, Mr. N. K. GOULD reported the presence of a similar disease in both *retusus* and *wisetonensis* sections of *Schizanthus* under glass. The

diseased plants exhibited a similar death of the flowers and dead, pallid stems, which were such a characteristic feature of the *Antirrhinums* in 1922 (fig. 70). Pieces of the diseased shoots when brought into the laboratory and kept moist very soon became covered with a fluffy white mycelium, followed by round sclerotia formed on the outside of both peduncles and shoots. On splitting these stems apart longitudinally, elongated sclerotia were found embedded in the pith. Diseased portions of the inflorescence also produced woolly, white, aerial mycelium, followed by sclerotia when kept moist.

Later in the same month Mr. EDMISTON, a student, brought into the laboratory the basal portion of a Canterbury Bell plant, the roots of which were covered with a thick white mycelium. Large sclerotia,  $\frac{1}{2}$  inch by  $\frac{1}{8}$  inch, were found in the pith of both collar and main root of the specimen.

A third lot of sclerotia were kindly provided by Mr. DILLON WESTON, who sent some down from Cambridge. The three lots (*Schizanthus*, Canterbury Bell, and the Cambridge material) were embedded in sand as before and kept outside until the early summer of 1925.

(iv) *With Ascospores in 1925.*

Early in June, 1925, the first two lots of sclerotia commenced to mature apothecia. The ascospores were collected from first one and then the other of these in a moist camel-hair brush, washed off into a large drop of water on a slide, and from this transferred by the same brush to the flowers of different plants on June 12 as follows:

(1) The inoculum (Canterbury Bell) was introduced onto the anthers and stigmas of three flowers on one plant (Scarlet Flame).

On the 19th the second corolla was found to be withering.

On the 22nd one of the two remaining corollas had fallen off.

On July 3 one withered corolla remained, but there was no other sign of infection in any of the three inoculated flowers.

(2) The inoculum (Canterbury Bell) was introduced onto the stigmas of four flowers of a white variety, the stamens having been removed.

On the 16th the corolla of the lowest flower was found to be withering.

On the 17th this corolla had fallen off.

On the 19th the second corolla had dropped, and of the two remaining flowers one appeared normal, but the other, the topmost one, now showed signs of corolla infection; the corolla was crumpled and limp, and two of the sepals had turned grey in colour.

On the 22nd the corolla of No. 3 flower had crumpled up; that of the topmost flower was white, as were also the calyx and peduncle. The axis at the point of insertion of this flower now showed definite signs of infection.

On July 3 the main axis was badly infected—an example of corolla infection in the absence of stamens.

(3) The inoculum (Canterbury Bell) was placed on the top of the anthers, the stigmas having been removed from five pink and flame-coloured flowers.

On the 16th the three lowest corollas had fallen off.

On the 19th one more had fallen, leaving one.

On the 22nd this last corolla had crumpled up.

On July 3 this corolla showed definite signs of infection—an example of corolla infection in the absence of the style.

(4) The inoculum (Dillon Weston) was placed between the corolla lips of five pink and flame-coloured flowers (all on one plant) from which both styles and stamens had been previously removed.

On June 16 the two lowest corollas had dropped and No. 3 was withering.

On the 19th the corolla of No. 3 showed definite signs of infection; the two remaining flowers seemed normal.

On the 22nd definite infection through the corolla was observed in No. 3, which spread to the peduncle—an example of corolla infection in the absence of both styles and stamens.\*

On July 27 further inoculations were performed.

Using ascospores derived from the *Schizanthus* sclerotia, four flowers of a yellow variety were inoculated in the following manner:

First (lowest) flower had its style removed, leaving the stamens and corolla. The inoculum was placed within the corolla on top of the anthers.

\* I am much indebted to Mr. N. K. GOULD for taking charge of and making the necessary observations upon the above four experiments in my absence.—W.J.D.

Second flower had both stamens and style removed, leaving only the *corolla*. The inoculum was placed within the lips of the *corolla*.

Third flower had the stamens removed, leaving the *style* and *corolla*. The inoculum was placed upon the stigma.

Fourth flower was not touched, and the inoculum was placed within the lips of the *corolla* and in contact with the anthers and stigma.

The pot containing the plant was placed in a vessel containing a little water and was covered with a bell-jar dipping into the water, thus ensuring a saturated atmosphere.

*Observation 1.*—On July 31, four days later, the corollas of 1 and 3 had fallen off and lay on the soil beneath, quite turgid.

*Observation 2.*—On August 1 the corolla of the fourth flower had fallen and the style of No. 3 was pendant.

*Observation 3.*—On August 4 no further sign on flowers 1, 2, and 4; No. 2 still retained its corolla. The style of No. 3 was hanging vertical, was limp, sticky, with drops of exuded liquid, and was pale grey in colour. Its calyx and ovary were still green. The corollas of 1 and 3, which had fallen onto the soil in the pot, were now covered with a fluffy white mycelium, and were no longer turgid.

*Observation 4.*—On August 5 on the pendant style of No. 3 white mycelium was present, spreading to the ovary, now yellowish in hue. The calyx was still quite green. Young, white sclerotia were forming on the fallen corollas of Nos. 1 and 3.

The third flower was the only one killed, and infection had clearly taken place at the stigma (as the corolla had dropped off) and spread down the style—an instance of stylar infection.

On July 30 a similar experiment was carried out. Again using a suspension of ascospores from the *Schizanthus sclerotia*, four flowers of a white variety were inoculated as follows:

First (lowest) flower had the style partly removed, leaving the *stamens* and *corolla*. The inoculum was placed within the corolla upon the anthers.

Second flower had the stamens removed, leaving the *style* and *corolla*. The inoculum was placed upon the stigma.

Third flower had both stamens and style removed, leaving only the *corolla*, and the inoculum was placed within its lips.

Fourth flower was not touched. The inoculum was placed within the corolla upon the stigma and anthers.

As before, the pot containing the plant was placed in a little water and covered with a bell-jar.

*Observation 1.*—On August 1, two days later, corolla of first flower had fallen off and the remains of the style was bent over. The corolla of the second flower (no stamens) was hanging down limp, but examination showed the style to be still green and turgid. Flowers 3 and 4 were not affected.

*Observation 2.*—On August 5 no further change in the first flower. The corolla of No. 2 was covered with mycelium; the style was found to be hanging over and yellowish in colour. The base of the calyx was yellowish. The corolla of No. 4 was limp, but the style and stamens were turgid. As this corolla was in contact with No. 2, it is possible that it might have been infected from mycelium spreading from No. 2. The third flower appeared normal, except that the base of its peduncle was covered with mycelium from No. 2. As before, only the one flower (No. 2) became infected; but in this instance the corolla was attacked first. In the infected flowers in both experiments the anthers were absent, yet the stigma of one was attacked, but not that of the other, though inoculated. In these last two experiments it is to be noted that, in the presence of an atmosphere saturated with water vapour, infection was more rapid, namely, two to four days, as compared with an average of nine days required in the greenhouse. Moreover, sclerotia were produced in quantity under the damper conditions.

### 5. Discussion on the Inoculation Experiments.

In the 1925 inoculations it was very noticeable that out of a batch of three to five inoculated flowers on the same inflorescence only one became infected; whereas in the experiments of the two previous years the percentage of infection was much higher, namely, 50 to 75 per cent. I am inclined to attribute the difference to the origin

of the ascospores, which in 1924 were derived from sclerotia formed on the same host plant, viz. *Antirrhinum*, whereas in the later experiments sclerotia were used derived from *Campanula* and *Schizanthus*. Whether this can be taken as indicating a slightly specialized parasitism on the part of *Sclerotinia sclerotiorum* the evidence so far available is not sufficient to determine, and previous investigations on this fungus have not suggested any such possibility. In 1922 POOLE\* evidently found no specialized parasitism between the sclerotinia on lettuce and that on celery, as he states "the fungus is carried into the greenhouse beds (for celery) in soil from fields where lettuce is grown. . . ." Further, in 1925 DAVIS,† working on the drop of cabbage, came to the conclusion that no physiological races of *Sclerotinia sclerotiorum* exist on the three hosts, Chinese cabbage, common cabbage, and head lettuce.

On the other hand, it may be that the various forms mentioned in this paper are distinct species akin to those recently separated in America. In 1920 JAGGER‡ described a *Sclerotinia minor* which produced a decay of lettuce and other plants similar to that produced by *Sclerotinia Libertiana* (= *sclerotiorum*) principally on the grounds that his sclerotia were much smaller and more numerous than those of *Sclerotinia sclerotiorum*. The dimensions of the ascospores and asci as given by JAGGER are a little larger than those usually accepted for *Sclerotinia sclerotiorum*:

JAGGER <i>S. minor</i>	asci 125-175 $\mu$ $\times$ 8-11 $\mu$ .
	ascospores 12-16 $\mu$ $\times$ 6-8 $\mu$ .
MASSEE § <i>S. sclerotiorum</i>	ascospores 9-13 $\mu$ $\times$ 4-6 $\mu$ .
STEVENS    , ,	asci 130-135 $\mu$ $\times$ 8-10 $\mu$ .

In 1924 RAMSEY,¶ working with a *Sclerotinia* isolated from the roots of salsify and carrot since 1920, stated that his strain "had characteristics that distinguished it from all other *Sclerotinia* species obtainable." The "characteristics" to which he referred were those of the vegetative growth and the size of the sclerotia. RAMSEY proposed the name *Sclerotinia intermedia* for this strain, though the dimensions of the asci and ascospores which he gave might be equally those of *Sclerotinia sclerotiorum* Mass.:

RAMSEY *S. intermedia*; ascospores, average 12.7  $\times$  4.9 $\mu$   
 asci, average 127.0  $\times$  7.5 $\mu$

\* POOLE, R. F., "Some Recent Investigations on the Control of *Sclerotinia Libertiana* in the Greenhouse on the Muck Farms of Bergen County, New Jersey," *Phytopath.*, 12 (1922).

† DAVIS, W. H., "Drop of Chinese Cabbage and our Common Cabbage by *Sclerotinia sclerotiorum* (Lib.) Massee (*Sclerotinia Libertiana* Fekl.)," *Phytopath.*, 15 (1925).

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(from *Antirrhinum*)

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The only other measurements made were those of the ascospores derived from the *Schizanthus* sclerotia :

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which are slightly larger than those obtained from the *Antirrhinum* material, but still fall within the limits as defined by MASSEE.

As far as the present work is concerned, sufficient data have not been accumulated to justify any separation either on biological or morphological grounds, and all the strains mentioned here have therefore been referred to MASSEE's species.

The inoculation experiments, in which flowers were several times successfully infected, show quite clearly that when ascospores of *Sclerotinia sclerotiorum*, derived from various sources, reach the insides of the corollas, infection may take place in one of two ways. Either the stigma is attacked first, the corolla falls off turgid, and the invading mycelium travels down the style into the ovary, and from thence through the peduncle into the main axis of the plant, or the corolla itself is the seat of infection. The mycelium spreads down its tissue, which does not fall off, until it arrives at the place where it joins the calyx, which becomes infected next. From the calyx the mycelium then spreads in two directions: one through the peduncle towards the floral axis, the other through the ovary to the style. Some of the infection experiments showed quite definitely that the ascospores can invade directly and rapidly the tissues of the corolla alone, the stamens and styles having been previously removed, though the greater number of infections took place via the stigma and style. It would appear, then, that the interior of an *Antirrhinum* flower provides favourable conditions for germination and infection to take place, even when the stigma with its sugary secretion is absent; and in some instances it was definitely observed that though the style was present yet infection took place through the corolla.

The ability of the germ tubes to penetrate unwounded tissues is probably connected with the absence of cuticle in the invaded organs (corolla and stigma). Another point worthy of note in these experiments is the falling off of the corollas in every inoculated flower in which stylar infection took place.

That the ascospores of *Sclerotinia sclerotiorum* can directly infect tissue has been known for some time, though the fact does not seem to have been recognized in some quarters. In 1910 PETHYBRIDGE \*

\* PETHYBRIDGE, C. H., "Investigations on Potato Diseases (Second Report)," *Jour. Dept. Agr. and Tech. Instr. Ireland*, 11 (1911).

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\* PETHYBRIDGE, C. H., "Investigations on Potato Diseases (Second Report)," *Jour. Dept. Agr. and Tech. Instr. Ireland*, 11 (1911).

showed that the ascospores of this fungus will bring about infection of the potato plant in two places: one, the older and lower leaves, and the other, through wounds in the scars left by fallen leaves. He also showed that infection rarely takes place at soil level by a saprophytic mycelium, as had been hitherto supposed, and thereby demonstrated for the first time that this generally accepted interpretation of DE BARY'S experiments\*—which he quotes—is not justified. Neither MASSEE,† nor DUGGAR,‡ nor STEVENS§ appears to have been acquainted with PETHYBRIDGE'S work, for the old assertion about the inability of the ascospores to produce direct infection appears in their respective textbooks. WHETZEL,|| however, endeavours to correct the older view in the new edition of his "Laboratory Outlines." In 1925 DAVIS¶ stated that at Massachusetts Agricultural College, in two inoculations with ascospores of the same fungus, he was unable to bring about the infection of living host tissue of Chinese and common cabbage, and that the longest distance over which the mycelium grew in the soil was only 5 cm. However, POOLE\*\* asserted that in the greenhouses of Bergen County, N.J., young celery plants had been infected yearly by ascospores of *S. Libertiana* (= *sclerotiorum*) discharged from apothecia on the surface of the beds. According to him, when the conditions of both temperature and moisture are favourable, young tissue is readily attacked.

RAMSEY †† in a recent paper gives details of his experiments with the same fungus, in which he obtained severe infection when freshly cut lettuce leaves were either sprayed with a suspension of ascospores or held over discharging apothecia.

### 6. Infection of *Antirrhinum* in Nature.

The appearance of the inflorescences of the originally diseased plants suggested, as mentioned before, the possibility of floral infection, a view which receives considerable support by the inoculation experiments recorded above. Up to the present, however, no definite evidence has been forthcoming as to the agents which conveyed the ascospores to the flowers. That some agent was present and responsible is quite obvious, for the *Antirrhinum* possesses a *closed*

\* DE BARY, A., "Ueber einige Sclerotinien und Sclerotinienkrankheiten," *Botan. Zeitung*, 44 (1886), p. 387 *et seq.*

† MASSEE, G., "Diseases of Cultivated Plants and Trees," 1910.

‡ DUGGAR, B. M., "Fungous Diseases of Plants," 1911.

§ STEVENS, F. L., "The Fungi which Cause Plant Disease," 1913.

|| WHETZEL, H. H., "Laboratory Outlines in Plant Pathology" (Second Edition), 1925.

¶ DAVIS, W. H., "Drop of Chinese Cabbage and our Common Cabbage by *Sclerotinia sclerotiorum* (Lib.) Massee (*Sclerotinia Libertiana* Fckl.)," *Phytopath.*, 15 (1925).

\*\* POOLE, R. F., "Some Recent Investigations on the Control of *Sclerotinia Libertiana* in the Greenhouse on the Muck Farms of Bergen County, New Jersey," *Phytopath.*, 12 (1922).

†† RAMSEY, G. B., "Sclerotinia Species causing Decay of Vegetables under Transit and Market Conditions," *Jour. Agr. Res.*, 31 (1925), p. 7.



flower which can be entered either by large insects such as humble bees, whose weight presses down the lower lip, or by such minute insects as thrips, which are small enough to crawl between the hairs on the lips of the corolla. Both these insects were present in some numbers in the greenhouse when the first diseased plants were discovered. The weather was sunny and warm at the time, and, the ventilators being open, numerous humble bees entered the house and were constantly observed visiting the flowers. Thrips were found *inside* the corollas of many flowers; but the source of the ascospores could not be traced, and no apothecia were found in the soil of the pots of the trial plants.

*Sclerotinia sclerotiorum* is of very common occurrence, and in every specimen of naturally infected plants so far examined a considerable number of sclerotia were present. Mention has already been made of the finding at Wisley of these resting bodies in *Schizanthus* and *Campanula*; also at Guildford in the same season in *Cheiranthus Allionii*. It is probable, therefore, that sclerotia are fairly abundant, and the chances are that the majority of these bodies find their way into the soil and rubbish heaps. As humble-bees make their nests also in the ground, it is not altogether inconceivable that some bees may come in contact with ascospores during the time the apothecia are emitting spores, and convey them to the flowers during their visits for nectar.

#### 7. Control Measures.

The fact that *Antirrhinums* can be attacked by way of the flowers does not necessitate any special line of treatment, for the source of infection—the sclerotia—and the damage sustained are similar as regards any or all of the numerous plants which *Sclerotinia sclerotiorum* will attack.

A diseased plant bears no spores, and is therefore innocuous to its neighbour, *provided* its diseased or dead parts do not come in contact with the older leaves of its neighbour. Other plants then, so long as they do not touch the diseased one, are safe from infection.

The danger of subsequent attacks lies in the *sclerotia*, and every effort ought to be made to prevent their formation within or on the *dead* tissues. Once these resting bodies are produced there is always a chance that some will fall off and reach a place where they will remain unharmed during the winter months, only to awaken into activity the following summer. From the apothecia produced by the sclerotia in summer, spores are emitted in large numbers, and it is these spores which bring about infection in the great majority of instances.

In Ireland\* the potato disease was partly controlled by late planting, whereby the plants did not drop their oldest and lowest leaves until some time after the apothecia in the soil beneath them

\* PETHYBRIDGE, G. H., "Investigations on Potato Diseases (Fourth Report)," *Jour. Dept. Agr. and Tech. Instr. Ireland*, 13 (1913).

had finished discharging spores. Recently\* it has been shown in America that, as regards the Brown rot fungus—*Sclerotinia cinerea*—of fruit trees, the apothecia are not developed in an alkaline medium, and by burying the mummied fruits produced by this disease with lime infection has been considerably lessened.

To prevent the formation of the sclerotia, diseased plants should be burnt as soon as possible, and not thrown on to the rubbish heap, there to produce sclerotia which may be distributed far and wide. Diseased plants already bearing resting bodies should always be burnt. There is no evidence so far that the sclerotia can survive for longer than one year in the ground, although other species, i.e. *S. fructigena* † on the Continent, *S. cinerea* † and *S. Mespili* ‡ in this country, seem to require at least two years in the soil before giving rise to apothecia.

In conclusion I would like to take this opportunity of expressing my thanks to Mr. N. K. GOULD for making the photographs which illustrate this paper.

### Summary.

A detailed account is given of a disease of cultivated Antirrhinums under glass in which the inflorescences and a portion of the main axes are killed by the fungus *Sclerotinia sclerotiorum* (Lib.), Mass. Certain species of *Schizanthus* are attacked by the same fungus with similar results.

The almost white colour of the killed shoots is a characteristic feature of the disease.

The ascospores of *Sclerotinia sclerotiorum* will directly infect the flowers of Antirrhinum in two ways, (a) via the stigma and style, (b) via the corolla and calyx.

Ascospores of this fungus were obtained from the following sources : (1) *Antirrhinum majus*, (2) *Cheiranthus Allionii*, (3) *Schizanthus retusus* and *S. wisetonensis*, (4) *Daucus Carota*, (5) *Campanula Medium*, and (6) *Phaseolus vulgaris*.

The sclerotia from all the above produce apothecia in the following summer when kept outside embedded in sand.

When Antirrhinum sclerotia were used the degree of infection was as much as 75 per cent., but with *Campanula* and *Schizanthus* material only 25 per cent. of infection was obtained. Whether this difference indicates a state of feebly specialized parasitism on the part of *Sclerotinia sclerotiorum*, or distinct species similar to *S. intermedia*

\* WHETZEL, H. H., "Laboratory Outlines in Plant Pathology" (Second Edition), 1925; EZEKIEL, W. N., "Hydrogen-ion Concentration and the Development of *Sclerotinia apothecia*," *Science*, N.S., 58, 1496, p. 166 (1923), abs. in *Rev. App. Mycol.*, 3 (1924), p. 141.

† WORMALD, H., "On the Occurrence in Britain of the Ascigerous Stage of a 'Brown Rot' Fungus," *Ann. Bot.*, 35 (1921).

‡ WORMALD, H., "Observations on a Discomycete found on Medlar Fruits," *Trans. Brit. Myc. Soc.*, 7 (1922).



FIG. 68.—PART OF INFLORESCENCE OF ANTIRRHINUM, SHOWING STYLAR INFECTION AT A, COROLLA INFECTION AT B.  $\times 1\frac{1}{2}$ .

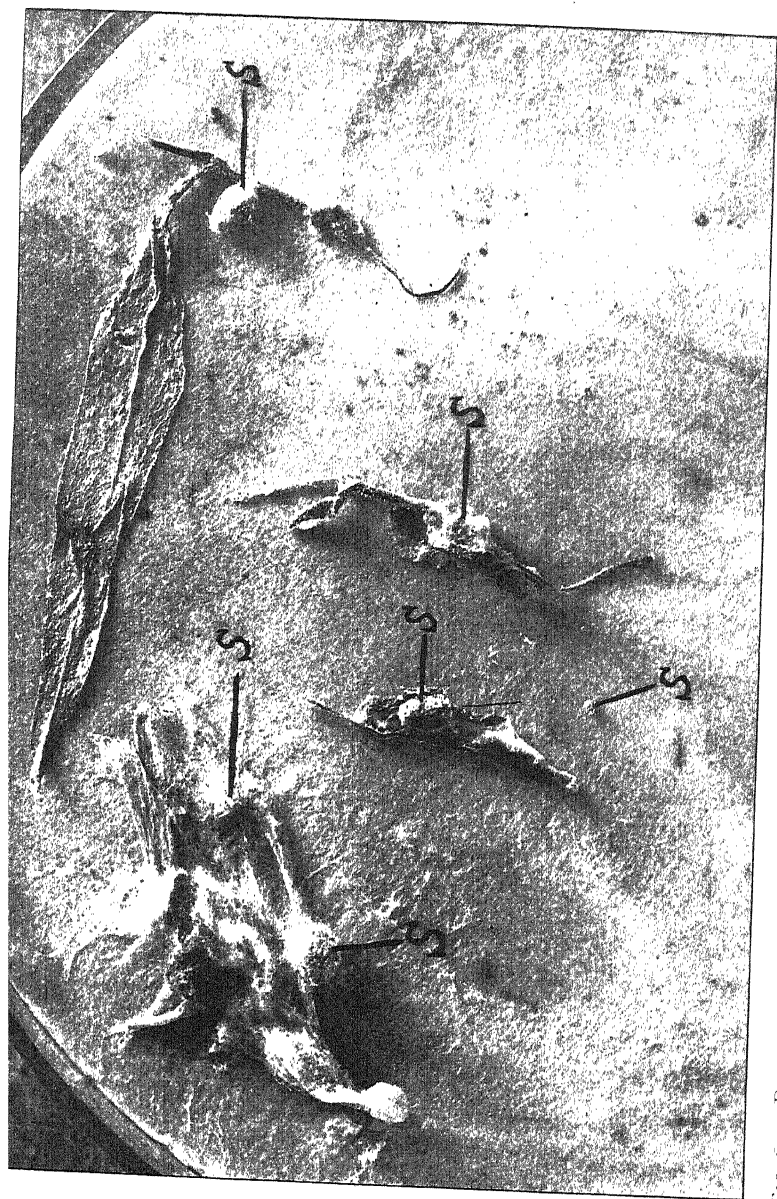


FIG. 69.—REMAINS OF INOCULATED FLOWER AND BRACT IN PETRI-DISH, SHOWING PRODUCTION OF SCLEROTIA AT S.S.  
(Slightly enlarged.)

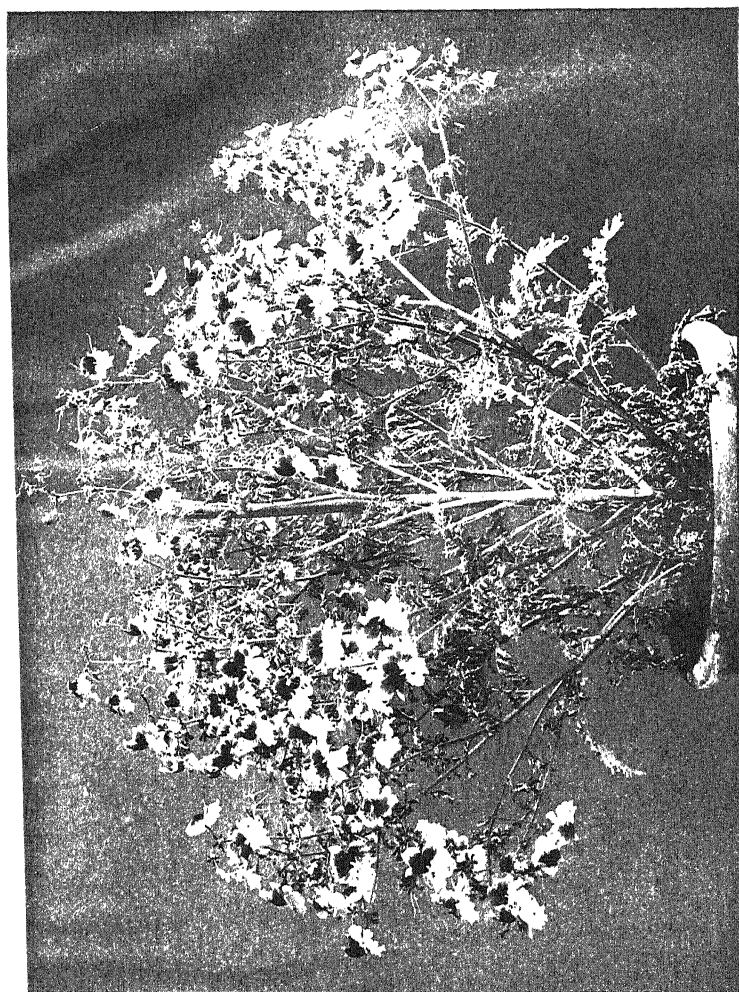


FIG. 70.—SCHIZANTHUS SHOWING WHITE STEMS AND DEAD FLOWERS ON PART ATTACKED BY  
SCLEROTINIA SCLEROTIUM.

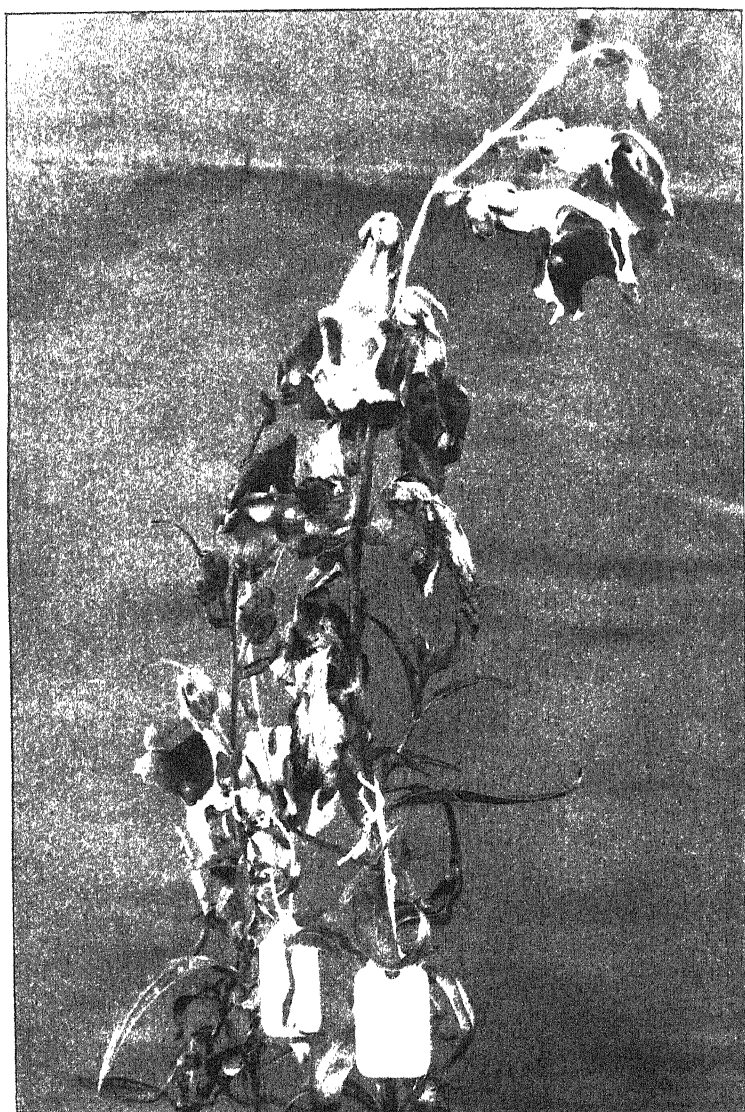


FIG. 71.—UPPER PART OF ANTIRRHINUM, SHOWING RESULT OF INOCULATION WITH *SCLEROTINIA SCLEROTIORUM*. (Natural size.)

and *S. minor*, the data at present available are not sufficient to determine.

Infection was more rapid and the growth of the fungus was more luxuriant, with a greater production of sclerotia, in a saturated atmosphere than in a relatively dry one such as obtains in a greenhouse.

The source of the original infection was not traced, but it is considered as likely that humble bees were the agents conveying the spores.

Suitable control measures are indicated.

## FLOWER-GROWING FOR MARKET IN THE ISLES OF SCILLY SINCE THE GREAT WAR.

1926.

By Major A. A. DORRIEN-SMITH.

As these islands are the pioneers of the bulb-growing industry in the British Isles, it may be of interest to try to record what has been done to rejuvenate the industry since the war, and especially since my paper was written in 1920 on "Narcissus Culture in the Isles of Scilly: Its Decline and Prospects of Regeneration."

In the autumn of 1920 considerable changes took place: by this time labour was beginning to dribble back from the war and settle down; and although the standard of wages set by the Corn Production Act made the task and capital expenditure involved enormously heavy, a start on a large scale was made.

The industry was further handicapped in 1921, as owing to the previous wet summer the bulbs did not ripen and in consequence it brought the yield of flowers very low indeed.

The question whether the industry could be maintained and continued was very seriously before my mind, owing to the general political outlook, the demands of labour, and the general interference of the Government, which latter may have been wise for the British Isles generally, but was exceedingly inappropriate to the entirely different conditions prevailing in these islands, and made the regeneration of the bulb industry a very difficult problem.

It appeared that where labour had to be employed on any considerable scale the matter was impossible. I therefore considered that the only hope lay in the smaller cultivator who could work his land with his own family. To this end, when opportunity occurred, farms were divided up, and the Duchy has continued the policy since; at the same time Tresco was divided into a series of small holdings, and I retained only a portion.

This, I am glad to say, met with complete success, and the industry, owing to the magnificent work all the islanders have put into it, is once more in a thoroughly flourishing condition, so much so that we have been able to build a suitable steamer for the trade, costing £25,000, from money derived almost entirely from the islanders themselves.

It may be asked what all this has got to do with the title: but in order to be consecutive some understanding of how bulbs were "produced from the hat" will, I think, be interesting, because without bulbs it is no good talking of marketing flowers.

That the production of flowers has risen from about 250 tons in 1921 to 750 tons in 1925, and will be larger still this year, is sufficient



proof of the extent to which the islanders have put their backs into the work.

All this, however, could not have been accomplished without the generous support of His Royal Highness's Council, because, apart from the recultivation, the actual bulb diseases had to be fought and the people in some way helped to understand how to deal with them. To this end the Duchy has employed an expert who acts as adviser to the Agricultural Committee and gives help to whoever requires it. The work Mr. G. W. GIBSON, our expert, has done cannot be too highly commended; there is also an Experimental Farm placed at the disposal of the Agricultural Committee by the Duchy Council which he works and in addition a large Barford & Perkins bulb-treating apparatus on St. Mary's to deal with our arch enemy *Tylenchus devastatrix* (Eelworm) when it appears. There is no doubt that this hot-water treatment, discovered and put into practice by the late Mr. J. K. RAMSBOTTOM, is a complete master of the disease; but the difficulties of overcoming the superstitions of the untrained mind and of obtaining attention to detail, which the treatment necessitates, are almost enough to fill a book, and it requires great patience, because without complete control the treatment must necessarily lose a good deal of its value.

If a bulb crop is to be efficiently maintained it is sufficient to have one-third of the holding in bulbs and the remainder in other crops, when two tons of flowers to the bulb acreage can easily be produced in a reasonably good flowering year. As a general rule the bulbs should be lifted every third year, allowed a few days to dry off on the ground and then removed to dry in cool sheds, sorted over, divided and selected and replanted; any surplus should be sold or thrown away, and above all the temptation to encroach on the balance, i.e. the other two-thirds of the farm, *should be most strenuously avoided*.

Now when the flowering season arrives a grower must always try to imagine what the buyer is thinking about and what are his requirements; although I think matters are a little better in this respect there is still plenty of mutual misunderstanding. The producer has arrived at various facts from experience, and the only means of keeping in touch with the buyer's requirements is through the salesman at present. Flowers must be fresh, at the same time they must be in full bloom; here for a start is a ludicrous contradiction—at least, so the producer thinks. Why not accept the flower in a burst-bud state in the market, and add another seven days to its life? Then they must be crisp and dry and well bunched—a dozen stems make up the bunch, arranged in four threes so as to give a good display of each individual flower; they must be well graded both for condition and size of bloom and length of stalk; considerable stress is laid on the last point.

Packing is done entirely in wooden boxes of suitable size; 15 inches wide and 23 inches long, inside measurement, is now the standard size, the depth varying from 4 to 5 inches according to

variety, the deeper boxes naturally containing the trumpet varieties. Cardboard boxes were tried, but the flowers did not arrive in the market in good condition, caused by insufficient ventilation, and so the use of cardboard was discontinued. The number of bunches in a box must depend entirely on the kind of flower, and is governed usually by the stalk; the bunches are wedged close together so that they cannot easily shift, and when the stalks are not too long two rows can be put, or, alternatively, the second row can be put corner-ways, making, say, fifteen bunches across the box and nine corner-ways, but clear of and not pressing on the flowers of the first row.

Polyanthus Narcissi and Daffodils should not be mixed together in the same box, and sorts and grades as far as possible should be sent separate; different grades of the same flower may be put into a box together, provided the box is marked accordingly on the end; but this of course would not be done except in making up what is over at the end of the day's packing. I well remember not long ago packing some fifty boxes of 'C. J. Backhouse' in one sending, containing thirty-six bunches in each box; when I came to the end I found I had only thirty-five bunches for the last box and I could not raise another bunch anywhere, so on looking round I found a few *Leedsii*, very similar in colour but rather shorter in stem, and into the last box I inserted one of them to make up the even number. Some six hundred boxes of various flowers were sent away that day, and my brother was in Covent Garden to witness their arrival; the first box opened was a 'C. J. Backhouse,' and lo, in it they found my bunch of *Leedsii*! I got a perfect tirade from both brother and salesman. "To be sure your sins will find you out"; so do not mix the sorts, and only pack complete dozens or half-dozens. Quarters of a dozen can be sent, but the market does not like it. Such tricks as above mentioned spoil your "mark" in the market, as the buyer, after opening the first box, likes to be sure that all the rest of the grade will be of a similar standard. Huge strides have been made to meet the requirements of the buyer, and he is more ready to reciprocate by giving better prices to those who attend to these matters; but that every box has to be handled eight times before it gets to market does not occur to him, nor that in bad weather, such as this year, the flowers have to be picked by men in oilskins and gum boots, tied in bunches of forty-eight or sixty stems and sent into the sheds, there to get dry and open—for they are picked with the bud just burst—graded, tied, packed and transported by sea in barges, in the teeth of gales across dangerous channels often in the dark or through thick fog, and put aboard the steamer.

There they are confronted by the same conditions on a larger scale, for Penzance, the only possible port, cannot be described as a harbour, entirely exposed as it is to south-east and south, while the facilities at the port too are no better but rather worse than they were in the 'eighties!

That all these flowers, from twenty to forty tons every alternate day, have to be got together and packed to time and tide and escape all these innumerable perils by sea and land is nothing to the buyer ; yet one often hears that the market is disorganized because the buyer does not come out in the snow or frost or wet or tram or railway strike to purchase them !

Mercifully the salesman has to get a living, and he finds someone to purchase at some price or holds them over until someone comes along. If the flowers are fresh and have had a good drink before packing they will stay for a week in the boxes without much harm, but whatever happens the producer suffers and bears the whole brunt of the costs, trouble, and anxiety, while the retailer sells to the customer at four times the wholesale market value of a bunch !

Perhaps it may be of interest to say something about the kinds of flowers most appreciated in the market apart from Tulips, which are not grown to any extent in the islands, and also to touch on the problem of " what to do with our son and daughter " bulbs.

There are very few, if any, new Polyanthus kinds that can beat 'Soleil d'Or' for colour, scent and lasting qualities. 'Gloriosus,' 'Grand Primo,' 'Scilly White,' and 'Grand Monarque' are also popular ; of new kinds 'Avalanche' and 'Compressa,' which follow on later in the season, are fine. The Polyanthus varieties flourish here as nowhere else in the world, and for this reason are our most valuable asset. Daffodils old and new are in legions, but it is only a rare chance that the hybridizer can produce anything more elegant than the old familiar kinds—"Spurs" or 'Princeps,' 'Bicolor Victoria,' 'Obvallaris,' and 'M. J. Berkeley,' a wild-looking fine type of aristocrat ; then 'Sir Watkin,' 'Emperor,' and 'Empress' follow later ; of the newer kinds of market Daffodils 'King Alfred' is as near perfection as anything probably ever will be, but its value as a market flower cannot compare with either 'Spur' or 'Ornatus' when the question of weight in transport and number of flowering bulbs to the acre is taken into consideration. 'Magnificence' too, which may be described roughly as a giant 'Spur,' is the earliest of all the new market Daffodils, the crop being finished before 'Spur' begins. The old 'Barri Conspicuus,' with the exception of perhaps one new form, certainly holds the field in the market, as does 'Ornatus' followed by 'Horace,' which is by far the finest of all the 'Poets' yet raised for market purposes. As to the "Sons and Daughters," only a few yet appreciate what can be done with them. That foreign buyers exploit the growers is a sorry fact ; they carry them off as impure stock, through neglect by the growers in "rogueing," for a mere song to foreign lands, where the trained eye sorts them ; they are then planted and well rogued and sold again in a short time to British buyers, plus the diseases their land knows so well how to produce. *Fusarium bulbigenum* and scale disease of a sclerotical type are difficult to deal with and are as yet little known, but they cause the fine fat foreign bulb so dear to the British customer to dwindle and

gradually die out of the ground, leaving nothing but a base plate to indicate its former exuberance.

The hot-water treatment has no effect on these diseases ; I have been caught myself by buying bulbs of foreign origin, and the diseases are far worse than eelworm, for we do not know yet how to deal with them. In appearance the bulbs look all right when planted, but after they have begun to grow a few curly leaves appear amongst the rest of the foliage as if the tissues were withered, preventing a natural flow of sap ; these leaves are often yellow striped or variegated in colour, rough and sandpapery. Then, when the bulbs are lifted at the ordinary time, it is found that there is a large amount of brown slimy skin round the whole bulb. The bulbs, of course, should be hard and dry or fairly so at this time of ripened maturity, but they are wet instead.

If an attempt is made to dry them in a shed they often become covered with blue mould. In some cases the bulbs collapse altogether and become mere puff balls, which I attribute to *Fusarium bulbigenum*. I have found no satisfactory means of dealing with this pest, and the best thing to do is to burn them before the spores get loose and spread.

In the former case the puzzle is to get the dirty skins off, and the only remedy I know of is to plant the bulbs in pure sand containing some humus such as decayed bracken produces and covered with an apology for grass ; plough the bulbs in, in furrows, turning the sod on top ; in one season they are cured and turn out beautiful shiny skins, having cast all their dirty ones somewhere. As far as is known at present these bulbs when planted back in ordinary soil do not revert to the diseased state.

But why purchase Narcissi abroad ? There are huge stocks, I believe, of good well-rogued Narcissi bulbs in the British Isles sufficient to supply the trade. I have discussed this question with several large growers and they have admitted there are enough, yet when you ask a grower if he has got a certain sort he replies " Yes ! I have a few which I bought from abroad ! " The fact is the great foreign bulb trade is thoroughly enterprising, and we are not.

## ROADSIDE PLANTING.

By CHARLES ELEY, M.A., F.L.S.

FOR some years past various bodies—public and quasi-public—have been eagerly engaged in agitating for the improvement of roads in the interest of motor traffic and the safety of other users. The steadily increasing yield of the ear-marked motor taxes has at length resulted in great activity throughout the country under the guidance of the Ministry of Transport, so those who live in the countryside, as opposed to urban dwellers, are now awakening to a partial realization of the conditions that the present policy of the road authorities has already created. The prospect does not please everyone. There seems to be some evidence that the draftsmen of the Roads Improvement Act, 1925, and the Public Health Act, 1925, had begun to feel that the changes which were taking place were not entirely progress (in the commonly accepted sense of that much used and much mis-used word), since the Roads Improvement Act, 1925, provides that County Councils may plant trees or shrubs, lay out and maintain grass margins and, in conjunction with the Public Health Act, 1925, prescribe or alter building lines. This is good, but it is nevertheless urgently necessary that all those who value the unique and restful beauty of the English countryside should take stock of the changes that have already taken place and use their imagination to forecast any further changes that may be pending. Clearly the Ministry of Transport cannot fairly be blamed for striving to carry out the task entrusted to it; but the public will be equally right if they scrutinize the methods employed and the result that seems likely to accrue. The object of the Ministry appears to be the creation throughout the country as speedily as possible of main trunk roads that will facilitate the transport of a large proportion of the nation's traffic, both of goods and persons. Whether this in itself is a "consummation devoutly to be wished" is not within the province of an article concerned with the planting of roadsides, but in order to appreciate this problem it is well to understand the procedure of the Ministry of Transport and the consequences of its methods in so far as they affect appearances.

At the outset operations appear largely, if not entirely, to have been confined to the provision of by-pass or "through" routes near London (and other large centres) and the expenditure upon chosen localities of money much more widely contributed. Soon, human nature being what it is, this policy aroused indignant demands that money widely collected should be widely spent, and some of the protestants were under the impression that, if obtained, the money would be available for the upkeep of existing roads and that thereby

some relief from local taxation would be gained as well as a general improvement of local facilities. As to this they are now disillusioned. The Ministry now offers to pay for what must be, as near as practicable, a straight wide road, which the local authorities are in future to maintain; should one county dislike the prospect or the terms, then another county, less squeamish, will obtain the money: therefore the issue is not long in doubt. As a result, almost as if by magic, we are confronted with miles of wire and of concrete posts, of cheap fencing in many forms, of felled trees, and uprooted fences.

Generally, in the common affairs of this life it is comparatively easy to see what ought to be done; usually the great difficulty is to decide whether the suggestion is feasible and advisable under the confronting circumstances. This last sentence reads rather like Mr. Pomponius Ego attempting to instruct his grandchildren how to obtain nourishment from raw eggs, but in spite of that it is truly intended as the guide to the suggestions that are to follow. Without doubt, County Councils and other public bodies will in the near future endeavour to mitigate some of the eyesores already created and to arrive at some middle course between beauty and utility that may serve as a way out of troubles yet to come. Let it be said at the outset that the provision of avenues of trees protected by guards (already decided upon by some public bodies) will often be found in practice to be unsatisfactory both from the æsthetic and the economic point of view. As the writer has urged at some length in "Gardening for the Twentieth Century," avenues are essentially a part of formal gardens, and so, while an avenue is a device that may properly be used with advantage in towns, it is generally unsuitable for use in the countryside, except in specially selected places, while tree-guards are almost an abomination that not infrequently defeats the object for which they are provided. It should be borne in mind that a practical difficulty to the successful use of avenues on country roads is that formality—the essence of an avenue—demands that an avenue should be straight or boldly and perfectly curved: circumstances have ordained that, for the greater part, even the new main roads are somewhat irregular and curly. Moreover, England is essentially an enclosed country as opposed to comparatively open countries like France and Belgium, so that it would be unwise to infer that the effect of the roadside avenues in France would be repeated (even if it were so desired) here where there would be fences running away from them at all angles. Avenues are difficult to maintain in perfection, and unless complete their effect is destroyed. The above may well seem hypercritical and evidence of an inability to appreciate the value and beauty of avenues; of course this may be so, but are not avenues too often adopted as being an easy method of dealing with a site that would be better treated in a more varied and less formal manner? At any rate all will agree that it would be a mistake to adopt hastily any procedure that may be condemned later by public opinion and, in consequence, administer a serious check to an admirable movement

on the ground that it fails in its object and is a waste of public money.

Roadside planting is necessarily very restricted in area though not in length, but, in order to make the best use of available space, the adoption of a system of groups, both of trees and shrubs—pure or mixed—would seem most likely to create the effects best suited to blend naturally with English landscape. There will be many banks, some large and high, that could well be clothed with shrubs, and in some cases with trees. When considering trees, roadside planters will do well to remember that there are upright-growing varieties of very many species of trees, and it would be well to make a liberal, but not *too* liberal, use of these fastigate varieties wherever space is much restricted, and it is consequently necessary to guard against the risk of too many boughs overhanging the road. That side of the road which is not occupied by telegraph poles should be dealt with first.

The excessive use of foreign conifers should be rigorously avoided. In this connexion it may be noted that ultimate success will depend upon selection of the right plants, and these should be sufficiently various to avoid any suggestion of monotony within the area. Hedges should be planted to replace later on the, in many cases, flimsy fencing that economy has compelled the present use of. Unfortunately, there are not many plants that will provide first-class protection against live stock, as has been set forth recently in the R.H.S. JOURNAL, 50 (1925), p. 173. Common thorn, hornbeam, holly, the cherry plum, the blackthorn, and the beech pretty well exhaust this list, and, unfortunately, beech is liable to fatal attack by the beech coccus. However, amongst the thorns and the hollies there are several varieties of which experiment for hedgerow purposes could wisely be made, and a certain number of other species suggest themselves as good “possibles” if a sufficient supply of small seedlings be available—but this matter shall be dealt with later. Of small and medium-sized trees of great beauty there is a wide choice, from which it is only necessary to make a careful selection, having regard to climate, soil, and situation. Large ornamental trees also present a wide choice, but in their use care must be taken to avoid in future years the possible necessity of either renewing them or allowing the roads to be disfigured by the monstrous shapes of trees that have been lopped or topped into tortured forms of aimless ugliness. Of shrubs it must suffice now to urge that evergreen and sub-evergreen species should be considered first, because their density enables them to keep down weeds with the least amount of attention, and in this connexion the denser they are the better. Such genera as Berberis, Cotoneaster, Elaeagnus, Rhododendron, Ligustrum (of this several of the Chinese species are admirable), Euonymus, Hypericum, and Genista afford a selection which comes readily to mind and from which a start could well be made. It is much feared that the foregoing will sound altogether Utopian to members

of public bodies who, as a class, are prone either to turn down new proposals or to instruct their officials to proceed with the job and to get it done quickly. In this matter "Hasten slowly" should be the rule; if this motto be adopted, then the necessary expenditure need not seriously worry the most determined economist, amongst whom the writer himself would wish to be classed. To satisfy those who regard with suspicion—so often rightly—any fresh expenditure of public money upon anything that can be regarded as not essential, it would be wise to set aside a definite and small annual sum—a "block grant"—and then to consider after a fair trial has been allowed whether the game is worth the small candle. *If the money be wisely expended* the answer need not be feared. It should be remembered that the disfigurement caused to the countryside by the cutting through of new and the alteration of existing roads will prove detrimental to localities where nothing is done to cover up the injuries. The converse is equally true.

Incidentally, it seems curious that "retired folk" in such numbers should prefer to build their homes right on the edge of the new main roads rather than to secure a quieter and healthier site upon a side road which, in addition, would secure greater privacy and so encourage less stereotyped treatment of their gardens. That Victorian inducement, "buses pass the door," seems one which is quite as strong in these days of King George V: undoubtedly in many cases repentance comes too late. To return to the main subject, if tree planting is decided upon it would seem hopeless, for economic reasons, to attempt in country districts to use expensive trees and to protect them with still more expensive—and hideous—guards, as is done in urban districts.

The most economical method would be to make use of the country school gardens to raise small trees and shrubs in conjunction with the fruit and vegetables now grown. There is no reason why this should prove a difficult task, or that too great a delay would be entailed at the start by confining it to the raising of seeds and cuttings: there are still nurserymen who specialize in selling very small plants at cheap rates, and a distribution of such plants amongst various school gardens would soon result in a supply of well-rooted plants of a size suitable to be planted out. In many cases, without doubt, an appeal to a parish for the voluntary gift of definite plants for sites within the parish would result in securing both the plants and that public interest which is so invaluable of the whole project. This procedure would of itself be a valuable lesson to the children and attract their attention to ornamental plants in addition to those of utility; but the effect of so doing would certainly have a far-reaching result upon the general scheme now in view, since one difficulty to be faced in connexion with roadside planting upon economical lines will be to instruct children (and in some cases their elders) that it is right from all points of view that they should render to trees and to shrubs the same kindly solicitude as they are now taught to afford to animals.



The fact that the plants were raised in the school gardens would surely arouse an invaluable interest and, it is hoped, respect for the ornamental plantings in the parish during that vital early period in which plants either are not ornamental or appear not to be desirable acquisitions! Towards this end the interest and co-operation of the parish council and of the policeman should be evoked when planting is commenced.

It is not suggested that the enthusiasms of Arbor Day could be wisely transported from America to Great Britain, but interest might be aroused by less sensational, cheaper, and perhaps better methods along the lines suggested, and much really remarkable work thereby achieved. One ubiquitous curse—the rabbit—casts a shadow on the proceedings; but careful selection of plants and their sizes and perhaps a share of the expenditure will ward off the peril. *Experientia docebit.*

This article has already assumed a size far greater than was originally intended, and time and circumstances make it impossible to attempt now to enter into further details either as to the treatment of sites or the suitability of particular plants. But if these ideas seem good and the principle is accepted it will not prove an insuperable task for those in charge to obtain the necessary guidance that in most cases will undoubtedly be required. If the work is to be well done, it will be foolish to attempt to do it in haste, as has already been said, but most certainly those public bodies who first, with prudence and simplicity, proceed to grapple successfully with the problem of retaining for their countryside the beauty for which it is famed will in time themselves achieve both fame and gratitude, and this latter, as is not unusual, will surely find some expression in that increased rateable value which is so dear to some hearts.

At any rate, in our efforts to please the users of motors, let us do everything within our means to avoid grafting on to the countryside those features—familiar to all—which already disfigure the outskirts of large towns and of districts in process of “development.”

“This may our judgment in the search direct,  
God the first garden made, and the first city Cain.”

## VIRTUOSITY IN VEGETABLES.

By Sir WILLIAM LAWRENCE, Bt.

ONE class of collector relies on well-known marks and characteristics—"Crown Derby" and "Chippendale." With "The Modern Traveller" he repeats—

"And as I did not know  
Its name or use, I let it go."

To another class the charm of collecting lies in unknown possibilities—in the autochthonous mysteries of Sassanian or Mayan art.

So with vegetables. Admitted that beans, peas, cabbages and potatoes form the backbones of the kitchen and kitchen garden, what romance can attach to growths with such names as 'Improved Perfection,' 'Korbfüller Wachsbohnen,' 'Pois Mange-tout de Barbieux,' 'Asparagi di Basano'? Whereas "Gombo" suggests the Devil Dancers of the Black Republic, "Finocchio" takes you to Florence and Taomina, "Udo" to the land of Hiroshigi and Hokusai, and "Pe-Tsai" to pig-tails.

Further, the names given to vegetables indicate the striving of the raiser towards size rather than quality. 'Mammoth Longpod,' 'Autumn Mammoth' and 'Mammoth White,' 'Riesen Zeppelin,' 'Grosser Gelber Dickkopf' are encouraged by the gold medals and congratulations of the Royal Horticultural Society and other societies. These elephantine monstrosities are an insult to the cook and to the intelligence. The perfect vegetable is the one that is brought along quickly and cut off in its youth. For the service of the *haute cuisine* in this country many vegetables, which could be grown nearly as well in this country, are invariably imported—for example, French forcing carrots, French beans, courges and lettuces. This is due partly to the fact that the climates where these vegetables are grown favour rapid development, but mainly to the selection of varieties for quality rather than a heavy crop, and the gathering of the harvest before maturity is reached. Nor is the latter uneconomical; thus, in the case of carrots, thinning is avoided and the ground can be rapidly cleared for another crop; again, with globe artichokes remove the leading heads in May and, by continuing to remove the leader, you will have a constant supply of artichokes until October brings a sharp frost.

For the gourmet the best carrots are the round or the horn carrots. The small round carrot which commands the Paris market has no core and possesses transparent, sweet, scarlet flesh. Similarly the best turnip is the 'Navet rond des Vertus.' The best beetroot belong to the American race, and 'Eclipse' is a good example. Peas and beans are too vast a subject; it is, however, worth while to grow in addition

to the well-known green vegetables a few rows of haricot beans—"flageolet." Good varieties are 'Flageolet Blanc' and 'Roi des Verts' and either of them is excellent in the green stage. In collecting haricots the plants are pulled up when the seeds are nearly ripe, tied in bunches and suspended upside down in an airy, cool and dry shed. When ready they are shelled, but it is not altogether easy to obtain an even sample of the green haricot beans, and they require careful watching. Again, sugar-peas—"Mange-tout" or 'Sans Parchemin'—are little known in England but are popular in France, where they can be had in early and late varieties and in dwarf, semi-dwarf and tall varieties. The famous 'St. Désirat' is the most delicious of all and makes the very best pea-soup.

Courges on the menu are always courgettes. In England the marrow is an anæmic, watery slab covered with "sauce colle"—bill-stickers' paste. In France it is a tender green or yellow fruit not more than three inches in any direction. It is always served with melted butter. Perhaps the squash 'Patisson' is the nicest, but a massacre of baby marrows always provides a delicate dish. Of course they must be cooked with their skins, and green skins are the best.

Of globe artichokes—a very ancient vegetable which was certainly cultivated in this country in the fifteenth century—there is one superlative variety, 'Gros Camus de Bretagne,' with a globular head composed of close, deep-green, fleshy scales; there is a form, 'Gros Camus d'Angers,' which is even superior but perhaps a little less hardy. The variety 'Gros Vert de Laon' has a great vogue, and is certainly the best where the artichoke is grown principally for the "fond." Artichokes, picked when they have reached an inch and a half to two inches in length, are delicious braised with meat; the mature "pommes" may be served cold *à la vinaigrette* or hot with *sauce hollandaise*. Seed does not generally come true, and plants should be raised from suckers planted in March. These suckers are best obtained from Angers or Orléans.

Gombo (or Okra) is *Hibiscus esculentus* and is largely grown in Cuba, tropical Africa, Central America, etc. In this country it can be grown in frames or in the tomato-house, but does best in a higher temperature, where it produces its primrose-yellow flowers and sets its deep-green fruits very quickly. Several varieties, for example 'Long,' 'Round' and 'Velvet White,' are grown. The fruits are either picked young and used in stews and soups (chicken okra is a common American dish) or allowed to set seed which is roasted and used as a savoury. In Cuba okra appears in some forty well-established dishes, each of which has its traditional tune.

The asparagus pea, *Lotus tetragonolobus*, is a small, deep-red flowered, bushy pea which grows wild in Spain and Central Europe. It forms long pods with four wings, or keels, and should be picked when the pods are one to one and a half inches long, before the "parchemin" has time to develop. *Sauté au beurre* it may stuff an omelette or be served with scrambled eggs. It is often listed amongst flower seeds!

Of *Aralia cordata* "Les Plantes Potagères" remarks: "It is one of the few Japanese vegetables that merit introduction into Europe." Called "Udo" in Japan, there are two principal varieties in cultivation—"Kan" (winter) and "Moyashi" (malt, or late). "Kan" is cultivated like seakale and "Moyashi" like rhubarb. The stools are remarkably prolific, and "Kan," forced and bleached, can be cut from for ten weeks. It should be cooked *à la crème* and has a slight aromatic taste. Largely grown in Japan and China, it was introduced by Dr. FAIRCHILD to America, where it has established itself; the Yokohama Nursery will supply stools which rapidly increase by division.

Fennel in this country usually suggests mackerel; this is the common fennel. In Southern Europe two plants are grown which appear to be merely varieties of *Foeniculum vulgare*, but have received the specific names of *officinale* (Allioni) and *dulce* (Miller). The first is sweet fennel, "Carosella," and forms a large self-bleaching heart which is eaten raw as *hors-d'œuvre*; the latter is the well-known Florentine fennel, "Finocchio di Firenze"; other varieties are grown near Bologna and in Sicily. Sown in rows it merely requires thinning out. When the "heart" is the size of an egg the row should be slightly earthed up, and the crowns will be ready for gathering in a fortnight. The crop is not altogether satisfactory in England, as there is always considerable loss through bolting. The best plan is to make sowings of seeds of some three or four varieties and at intervals of two to three weeks (M. HERB, Naples, specializes in fennels). The taste usually associated with fennels is almost absent, and it does not notably attract the writer's Siamese cat. Try it—the fennel, not the cat—in a ragout of veal.

Aubergines reach London in large quantities and can be bought much more cheaply than they can be grown. They must be raised under glass, pricked out, transplanted, always in a hot-bed mixture, and their final quarters (six to nine to a frame) should be in a bed composed of half manure and half garden soil to a depth of eight inches. Superfluous flowers and growths are removed from the plants, and the leader is pinched in late summer. When established they require plenty of air and sunshine. They are liable to be attacked by *Phytophthora* (spray with Bordeaux mixture) and by White-fly, and dislike cold, rainy weather. As excellent fruits can be bought for 1d. each off barrows in Soho, the wise gardener will not attempt to grow them in this country! They are eaten stuffed or cut in strips and fried. The 'Long Purple' is the most commonly grown and the best; there is a pretty little white Chinese egg-plant and a hectic purple and white striped variety from Guadeloupe. Seed of 'Long Purple' can be bought from any seedsman and the other varieties from M. HERB and Continental dealers generally.

Sweet-peppers and Capsicums are much easier to grow. They must be raised under glass but do not require a hot bed; they should be well pinched, and in the case of the large-fruited kind fifteen fruits to the plant are enough. As a general rule the small-fruited varieties

are hot, and large fruits (Sweet-pepper) mild. *Capsicum annuum* has produced as many varieties as *Canis familiaris*. Long, short, round, square, oval, pointed, pendant, upright, horned, 'Elephant's Trunk,' they may be had in as many colours as a dance-frock—red, yellow, white, black, purple, green and chameleon. If you do not want to eat them they form nice parlour plants, or you can stick a fruit onto *Ruscus aculeatus* and send it to the Royal Horticultural Society for identification. The large Sweet-peppers, "Pimento," are excellent stuffed, and for this purpose thin-skinned, pulpy and mild varieties should be chosen, such as 'Spanish Bull' (singular nomenclature!). Of hot peppers Cayenne, Chili and the long black pepper of Mexico, the last the hottest, are all good. They form the flavouring of three excellent dishes—*Côtelette de porc à l'Hongroise* (Paprika sauce); *Consommé Madrilène* and *Œufs brouillés au piment*.

The cardoon is merely a varietal form of the artichoke, *Cynara Cardunculus*. It was certainly known in England before 1611, as COTGROVE in that year speaks of "spaces . . . left for Cardoones between rowes of Onyons," and defines "Cardoones . . ., the stalkes of Artichokes, or of the white thistle buried in the ground, or otherwise used, to get them a whitenesse (excellent meat)." Yet in 1882 Mrs. REEVES, in her book of cookery, writes, "This excellent vegetable is little known in England." Unlike the artichoke the cardoon must be grown from seed. It can be bleached either by straw bands or brown paper. It is a good vegetable, but takes up a great deal of room. There is a traditional method of cooking it, namely *à la moelle*. The Tours cardoon is the most esteemed.

Celeriac, grown like celery, but not banked up, is cultivated extensively in Germany, where the celery we are used to is called English celery, and to a considerable extent in France, where it is often found bordering the paths of the kitchen garden the same way as we grow parsley in this country. Celeriac is excellent in a *purée* or salad.

Many kinds of oxalis may be eaten, but the Peru "Oca" is the only one worth trying. The tubers, which are white, red and yellow, are grown like potatoes, and when lifted should be wrapped in flannel and exposed to the sun, under whose genial rays they lose their acidity and become sweet and floury. If you forget all about them they are said to dry up and to become indistinguishable from figs.

Sorrel (*Rumex Acetosa*) is grown from seed, the young plants being thinned out to form a bed. These plants may be divided, and a bed lasts three to four years. Frequent picking of the young leaves is essential and the plants must not be allowed to flower. An interesting new red variety, the colour of beet, has been raised by CAYEUX and LE CLERC. Sorrel is cooked like spinach and is also used in two soups, "Bonne femme" and "Santé."

In the cultivation of maize, *Zea Mays*, in this country it is important to choose an early and quick-growing variety. The sugar-corn may be eaten at various stages: "Grünkorn Suppe" when very young,

half ripe, creamed (e.g. as in *Œufs à la Maryland*), and on the cob. For the latter the cob is boiled, slightly toasted and mounted on a skewer to enable it to be dipped into melted butter. It is better eaten in the family circle, and should on no account be offered to an aunt from whom you have expectations.

There are many salad chicories, but the most interesting variety of *Cichorium Intybus* is 'Witloof.' The cultivation of this vegetable was originally confined to Belgium, but it is now largely grown in France in the neighbourhood of Paris. The usual plan is to plant the trimmed crowns in trenches, and the crowns are forced as required by being covered with manure to a depth of some twenty inches. In a fortnight the manure can be moved to the next section and the exposed crowns, with their growths, covered with matting. 'Witloof' is ready for cutting in about a month from starting the crowns. In Paris it is also grown in dark cellars at a temperature of about 58° F.

So far we have refrained from stirring up those giants among vegetables which form the staple foods of temperate climes—cabbages and potatos. *Brassica oleracea* comprises cabbages, cauliflowers, brussels sprouts, kohlrabi and swedes, while *Brassica campestris* covers turnips and an interesting Chinese vegetable, Pe-Tsai. Of the cabbages, kohlrabi (chou-rave) is fairly well known in England and listed by most seedsmen. In Germany it is a staple food, and mutton boiled with young kohlrabi and carraway seed is worth trying. The white is better than the violet. Pe-Tsai, which in appearance is intermediate between spinach-beet and cos lettuce, is grown and cooked in the same way as an ordinary cabbage and is milder to taste. It has many local names—Corean, Chefoo, etc.—and there is, or was, another Chinese cabbage, Pak-choi. The difficulty of growing these Oriental cabbages in this country is that they all have a tendency to bolt, and consequently it is desirable to make successive sowings.

Potatos are perhaps not exciting vegetables, but their romance lies in the fact that, as every schoolboy knows, they were introduced into England in the sixteenth century by Sir WALTER RALEIGH from Virginia, a country to which he never went, of which the potato is not a native, and where it was certainly not grown at the end of the sixteenth century. Potatos were possibly first grown in Holland, and the best potato from a culinary point of view, the Dutch yellow potato, is still largely grown in that country. Potatos are little grown in this country for salad, and for such purpose the Fir-apple potato is distinctly worth trying. Curious in shape, it is difficult to peel, and a more convenient salad potato is the Hamburg egg-potato. Another interesting variety is Congo ('Négresse'), which, when cooked, is a rich violet and looks very pretty in the salad. *Solanum Commersonii*, the Uruguay potato, crops up from time to time. Vigorous and free from disease, it has also considerable drawbacks: the roots spread over about ten feet and the tubers are a foot apart, and when you have collected them you find that they have a pronouncedly bitter taste.

There are a lot of Chilean potatoes which you can buy from HAAGE and SCHMIDT of Erfurt.

The Royal Horticultural Society's Gardeners' Diary has a curious little note on asparagus which encourages this writer to do the same. If you have a melon or cucumber pit, grow your asparagus in seven beds, the size of which may be determined by your requirements, lift the crowns from No. 7 each year and force them in the pit, when they will give you sprue from the first of December to the end of February. Then in March sow a new bed beyond No. 1 and so keep up the cycle. Try, if you like, bleaching one bed by heaping sand or sandy soil over the crowns. Bleached asparagus is delicious in a ragout of baby chickens ("Bremen Kuchlein Ragout").

Japanese artichokes (Crosnes) are the tubers of *Stachys affinis*. They are not more than 2 inches in length, and look as if they were turned out of ivory. They should be lifted as required, the ground being protected against severe frost by means of straw litter.

Vanilla is obtained from an epiphytic orchid, easy to grow in a stove and difficult to flower. The inconspicuous green flowers have to be fertilized by hand. The pods, which take six months to develop, are picked before they split and laid in folds of flannel in a warm place (a kitchen shelf) to ripen. After a few weeks they will be found covered with white crystals of vanillin. An article in the *Neue Freie Presse* declares that the flavour of Turkish cigarettes is due to inter-cropping tobacco with vanilla, which traveller's tale at once recalls the Pomato, which bears tomatoes and potatoes at the same time.

Withal and in spite of our labour-saving friends in America, the time has not yet come when we can ignore Candide's advice—"One must cultivate the garden," and the writer of these notes hopes he may sufficiently interest some of the readers of the JOURNAL in vegetables to enable them to appreciate that a young horticultural blood may dabble in turnips as well as in delphiniums, and may even pursue parsnips as lustily as he does pinks. At Wisley many vegetables are tried, and many are found wanting while few are chosen. Follow the trials, order seed, and if you are dissatisfied write to the Director, who will indubitably explain, in words that cannot be mistaken, that it is your fault, not the seedsman's or the seed's. *A fortiori*, if your cook gives notice do not blame the writer of this article, but merely remark that youth is knocking at the door, and promote the kitchen-maid.

## SOME LITTLE-KNOWN VEGETABLES.

By E. BECKETT, V.M.H.

[Read October 6, 1925 ; Sir WM. LAWRENCE, Bt., in the Chair.]

If it were possible, at this advanced age of the world, to discover the genesis of vegetables as food, many interesting and probably startling facts would no doubt emerge; but I am afraid that such details are now hidden in the unknown and unrecorded history of those dim ages, when man in his fight for existence against most formidable odds had to search round for the means of living, and experimented with the herbs of the field. Doubtless then, as now, sacrifices had to be made in the quest of knowledge, and one can well imagine folk of those primeval races falling victims to plants that looked good to eat but were really harmful, even as nowadays one hears of child victims to harmful forms of vegetation; such as the Deadly Nightshade or the poisonous seeds of Laburnum.

No doubt progress in such knowledge was slow, but still the search goes on, and even in these modern times, when we seem to pride ourselves that most things are patent to us, there comes to our knowledge, from some uncivilized race, a fresh item that we can use for our daily menus.

We are usually very slow to take hold of the new introduction. Possibly with the inherited instinct of the progenitors of our race, we are very shy in trying out the new find. Even if we do try it, I am afraid that more often than not those responsible for the cooking rather fail in their task, and spoil our trial at the start by serving up in somewhat unpalatable condition what might otherwise be a very tasty dish. As a nation I do not think we can class ourselves as good vegetable cooks, for, with the sad experience of hotel and restaurant vegetables, I feel that though we may be second to none in the growing of vegetables we could yet learn many a lesson from the Continent in the methods of preparing them for table.

I have compiled a list of about thirty vegetables to submit for your consideration as practically unknown so far as this country is concerned. Many of them I have grown, and there may be some included in the list that are quite familiar to a few, and perhaps highly appreciated by some of my hearers, but to the multitude they are unfamiliar.

*Aralia cordata*.—Few have even heard of this salad vegetable for spring use, yet it is a great favourite in Japan, and is becoming well known in America. The young shoots are the edible portion, and they require to be well blanched, like Sea-kale, and similar methods and apparatus may be used as with that vegetable. It is described as having a delicate "piny flavour," when the vegetable is properly



prepared, and it can be grown to come into use a few weeks before Asparagus. It is either cooked like the latter, and served similarly, or it may be employed in the raw state as a salad. Plants will produce their young shoots each spring for a period of years, up to about ten, and require to be planted 3 to 4 feet apart each way. Provided they are given good fertile soil, to make ready growth, not retarded through want of manure, they will require scant attention, and show little partiality to any particular class of good garden soil.

*Artichokes*.—I would refer, firstly, to the Jerusalem types which, though pretty well known, are not cultivated as they should be. Poor, inferior, old forms, miserably grown, are mainly responsible for this. It is over three hundred years since the Jerusalem Artichoke was first introduced to Europe from America, and the process of improvement with this particular vegetable has probably been more slow than any other we know of. There is still enormous possibility of improvement, so as to combine the qualities of various forms, such as shape, yield, and food value, and, though it is now over a century since the firm of Messrs. VILMORIN first turned their attention to this vegetable, to such end, and through several generations, that they have accomplished much, yet real perfection has still to be attained. In the meantime it behoves us to give proper cultivation to the better forms, with the idea of making the best of a most delicious vegetable, which always remains a prime favourite once the palate has acquired a liking for it, and to stop growing worthless forms in the roughest corner of the garden, where they receive no care at all. Many, too, must learn to serve them properly.

Let us turn now to another Artichoke—the Chinese *Stachys tuberosa*, which has no relationship to the Jerusalem variety. I have called this by the common botanic name in this country, though I believe the correct name is *Stachys Sieboldii*. How little this Chinese vegetable is known here! In France it is highly appreciated in the leading restaurants, and incidentally, I believe, equally highly priced, so well favoured is it as a luxury. There it is most carefully boiled for about a quarter of an hour (longer boiling spoils it), and served like Broad Beans, with suitable sauces. It is also fried, employed in salads, and forms an excellent ingredient in “mixed pickles.” I suppose the obstacle it has to surmount here is the fact that it is “fiddly” to prepare for cooking, being of small size and formed of rounded segments joined together in long shape, like closely strung beads. Given a warm sandy soil, which has been manured in the previous season, it will thrive well from “seed tubers” planted in March, 3 inches deep, 1 foot apart, and with 18 inches between the rows, being ready for lifting in October preparatory to storing in sand.

*Aubergine, or Egg Fruit*.—Ask our Continental friends about this, or our kith and kin from India, etc., and hear the former exclaim in ecstasy, or the latter murmur “Bringals” in happy, recollective tones, and then inquire why it is the Englishman hardly ever sees

it, and more rarely still tastes it. Fried in various ways, or nicely braised when stuffed with savoury mince, it certainly takes a lot of beating as a vegetable. I suppose it is a little difficult to grow, requiring to be raised under glass, and often to finish off under the same conditions, as our climate cannot be trusted to complete the fruits for table in the open air.

*Bamboo Tips*.—Here is a curious vegetable to our insular minds, yet I wonder more has not been done to bring it to this country, for *Phyllostachys pubescens* is a great delicacy in China, and one in which a very large trade is done. The young shoots are removed from their hard sheath-like covers, the tough base cut away, the edible part sliced small, boiled for about two to three hours in salted water, and served with melted butter. Those who have tried this dish assure us that it is one that most palates would appreciate, owing to the crispness of the actual vegetable as well as its rich, pleasant flavour. It is grown in America, and much is being done there now to raise this desirable addition to the vegetable list for early spring use, and I think that in time Englishmen will become epicures in the matter also.

*Celeriac*.—The turnip-rooted Celery is another vegetable that should be most popular. Well cooked, this is one of the most delicious winter vegetables that I know, and here again, probably, growing and serving inefficiently are the reasons for its scarcity. Though not particular as to soil, Celeriac requires properly trenched and manured ground and plenty of moisture to grow properly, otherwise it means that small, strongly flavoured roots are produced. Service calls for proper cooking, and the addition of white sauce to make it a dish fit for any table.

*Chervil*.—Whilst there is a certain demand for the top growth of this herb (*Anthriscus cerefolium*) for salading purposes, little seems to be done with the bulbous root portion; and I believe that much could be accomplished by careful selection to attain these of good size, and thus turn to account a really useful vegetable product, such as could be employed for service, say, with game, for the flavour of the bulb would lend itself to such special purpose.

*Chicory*.—Despite the fact that "Succory," as it was familiarly termed at one time, is a native plant, little has been done to make that desirable improvement in it that it deserves. We look on it principally as an ingredient of the salad-bowl, but on the Continent they have risen to the knowledge that it is a useful vegetable when properly cooked. Again, one must urge the growing of only the best strains, for there are decidedly inferior sorts on the market, and much can be done to improve it by selection towards producing a finer vegetable. Good ground preparation (without freshly manuring) is important in its cultivation, and the proper blanching is a matter requiring careful attention. It can be brought into use in mushroom-house or cellar throughout the winter, and, even though not required as a vegetable, yet as a salad it is almost indispensable nowadays.

*Couve Tronchuda*.—Ask an average greengrocer for a “Portugal cabbage,” and I wonder what the reply would be! It is pretty certain that nine out of ten vendors would not know the article asked for, and yet it was introduced to this country over one hundred years ago. Not many growers really know it, yet, given well-trenched and manured ground, it grows merrily from a mid-March broadcast sowing, planted out at 30-inch intervals each way. Given plenty of water in dry spells and an occasional feeding with liquid manure, good plants should result, the most edible portions of which are the midribs of the outer leaves, which are tender, white, and delicious when cooked. There is no waste here, for when the outer leaves have been used the hearts may also be served.

*Cardoon* is another prominent Continental vegetable not much utilized here. The probable hindrance to this is the blanching, which requires eight to ten weeks to accomplish, and must be thoroughly done. Cultural methods, such as apply to Celery grown in trenches, are applicable to Cardoons, and another important point to bear in mind is not to sow earlier than the very end of April or early in May, otherwise premature bolting to seed is a frequent happening. Blanching is best accomplished by degrees. Wrap a strip of brown paper around the base of the leaves, when drawn together, then place over this a length of hay band, and then bank up with a little soil, repeating this operation at intervals. Good cultivation and blanching will well repay with an excellent vegetable and good supplies.

*Dandelion*.—I believe this salad vegetable has a big future before it, for improved varieties are on the market, and when well grown on rather dry, well-drained ground, properly blanched as required, it is an excellent salad. For winter work it can be treated along the same lines as Sea-kale, and it is decidedly useful when Lettuce and Endive are scarce.

*Florence Fennel, or Finocchio*.—There are several Fennels that have useful culinary properties, our own wild form *Foeniculum vulgare*, for instance, being used for preparing sauce for serving with fish courses. Its Italian form is a pleasant and worthy vegetable, the part that is used being the bases of the leaf-stalks which swell out just above ground. These, carefully blanched, may be eaten either raw or cooked, and are approximate to celery in flavour. Good cultivation on rich soil pays with Fennel, and a plantation once properly made will thrive for years, though it is perhaps better to treat the Florentine form as an annual, sowing the seed in drills about 2 feet apart in May, and thinning to 18 inches in the rows.

*Edible Hibiscus*.—Our American cousins from the Southern States impress us with the merits of an edible member of the Malva family, an annual with the botanic name of *Hibiscus esculentus* and two colloquial names—“Okra” or “Gumbo.” The portion utilized is the very fleshy seed pods, and they tell me that it is the finest vegetable there is for soup purposes. Of course one is under the necessity of pointing out the differences of climate, but, for the warmer parts of

this country, and in frames on hot-beds, this might well be attempted, and I should imagine with every success. The pods can also be fried in butter, and make an excellent dish in that form.

*Kales*.—Two forms of this big group of the Brassica family require comment, owing to the neglect shown them. The first that deserves mention is the true Labrador Kale, hardly known, and yet I have grown it, from seed brought me direct from Labrador by a lady to whom it greatly appealed, over forty years now, and I must say that I look on it as one of the most delicious Kales, and probably one of our most attractive green vegetables of to-day. I am also able to recommend it on account of its great hardiness, prolific yield, and lateness of season. Why it is so neglected I cannot think, for it certainly is not more difficult than any other to raise. It should be sown very late, not before the end of July, in drills, and thinned like Turnips.

The Stem or Marrow Kale is considered to be a close relation to the Kohlrabi, to which I shall next refer. I have seen Stem Kale standing 6 feet tall, with thickened succulent stalks, but in that state it is only fit for its principal use, that of cattle feed; but if the young plants are taken at about a foot and a half tall, when the thick stem is tender and decidedly edible, then we have a vegetable that can be considered in every way an addition to the list of table vegetables, and such as can be, if properly prepared, a most palatable dish.

*Kohlrabi*.—Here we have a vegetable that will undoubtedly be greatly improved on in years to come. Principally known in this country as a fodder plant for cattle, yet, properly grown and served, it is a vegetable that makes a most useful change, and on the Continent great use is made of it. It is looked on by many as a mid-form between Kale and Cabbage. Somewhat like a turnip in appearance, it should be cooked in similar manner, being selected for the purpose in a young stage, before it gets woody or strong in flavour. It will then be found to have a distinct nutty flavour, something between a turnip and a cabbage. This is another of the vegetables much prized in India, for it is an excellent drought-resisting plant.

*Lagenarias and Cannas*.—I have linked these two together with a view to pointing out that even plants which we look on as ornamental only have their uses as food, though it is very doubtful if much use is made of these two in this country. I have seen *Lagenaria* fruits at one of the R.H.S. shows, exhibited from the point of view, I believe, of demonstrating their food value, but I do not recollect *Cannas* being shown with the same idea. The common and edible form of *Lagenaria* (*L. vulgaris edulis*) is made good use of in Italy, where it is cooked in the same way as Vegetable Marrows, and it could be well raised under glass in this country, finishing off its growth in the open in the warmer districts.

*Canna edulis* is used in Queensland as a producer of arrowroot, and has a pretty tuber, which, when cooked in the manner of a turnip

is a very palatable vegetable food. It appeals to me as one that we could employ for the purpose in this country, though, as it would be necessary to raise under glass, it is a little doubtful as a commercial vegetable, but certainly one that might be well received in private establishments, where the aim is to have the greatest variety of vegetables possible.

*Maize*.—I suppose there are few more popular vegetables in the United States than Indian Corn, or, as it is termed for culinary purposes, "Sweet Corn." Much experiment is being made for its improvement. Although a native of America, the spread of its growth is remarkable, for it is being grown the world round, from such northern countries as Canada and Russia to South Africa. The edible portion of this vegetable is the young green cob, picked before the seeds harden. If raised in gentle heat in this country and, after well hardening off, planted out in the open about the end of May, on a warm, sunny, well-trenched and enriched piece of ground, it will repay amply for this careful treatment, provided always that sufficient growing space is allotted to it.

*Nasturtium*.—I only refer to this, which I think practically anyone can grow, to draw attention to the fact that the seed, which the plant produces freely, can be employed in the same way, and for the same purposes, as Capers.

*Oxalis tuberosa*.—When I first saw the pretty tubers of this "Wood Sorrel," I could scarcely believe they could be really edible; but I was assured by the friend who had sent them to me that he had grown them for some years, and that when put into a covered frying-pan, with salt and pepper and butter, and allowed to cook steadily in their own juice, although they turned from their fascinating bright pink colour to a yellow tone, they were a very pleasant dish indeed, and so we found them to be. This again is fairly well known on the Continent, and especially in Italy, being in season during autumn and winter. It is a native of Bolivar, and I believe there is also a species from Peru (*O. crenata*) similarly used. Grown from tubers in light soil they give a good yield. In this country we only appear to have the red tuber form, but there are also yellow and white forms.

*Pekin Cabbage*.—What our forms of the popular and serviceable Brassica mean to us, so does the Pekin Cabbage and its allied forms mean to China and Japan, and to describe all the many varieties would well fill a volume, there are so many. It would be well to introduce some of the best to this country, for it is claimed that some of them can be had to perfection in the time that it takes to grow a decent Lettuce, and though the Pekin Cabbage and its allies are not unknown here yet I suppose it might be stated broadly that nine out of ten people have never heard of them.

*Perpetual Spinach*.—Not really a Spinach, but actually a Beet, this is a useful follow vegetable when the true Summer Spinach is over, for the leaves can be prepared for table in the same way.

It likes good rich soil, and seed should be sown about the middle of March, making, if desired, two further sowings at intervals of a month. Thin the seedlings to 9 inches. Though useful, it can hardly be considered a first-class vegetable.

*Spinach or Sea-kale Beet.*—A native of Portugal, this form of Beet is grown solely for its leaves, the thick fleshy midrib being a delicious vegetable when cooked and served in the same way as Asparagus, whilst, like the foregoing, the leaves can be treated like Spinach. It is a useful autumn vegetable, of good yield. Seeds should be sown at the end of March, in drills 18 inches apart, and the resulting plants thinned to 15 inches. Keep well supplied with water and liquid farmyard manure, and the plants will produce the desired succulent leaves. These are pulled, not cut, from the plant as supplies are required, and thus continue to yield for some little while.

*Sugar Peas.*—The “Mange-tout” of France, which we call the “Sugar Pea” in this country, is another almost unknown article of diet here. Standing distinct from the ordinary garden pea, it is prepared differently for table. Being without the tough interior skin to the pod, like that of the garden pea, all it is necessary to do is to remove the tip of the pod and the stalk, and it is then ready for boiling, the whole being edible. Seed of this can be sown in the ordinary way, in May, and the plants, reaching a height of about 8 feet, will require careful staking. It is a very free-bearing form, and the pods should not be allowed to get at all old before being picked. There is every scope for it in this country, once the opinion of the public gets educated as to its utility.

*Sweet-peppers.*—In France, Spain, and the United States, these are considered really first-class vegetables, and I believe there is a large industry in the canning of Peppers in the States. By the courtesy of the U.S. Department of Agriculture, we were privileged to receive seed of a good number of varieties of these, which had been introduced to the United States for trial, and these were found excellent. These “Pimentos,” as the forms of *Capsicum annuum* are termed, can be grown along the same lines as the forms of Capsicums and Chillies we already know in this country, sowing the seed in a temperature of about 65° in February, potting the plants on from time to time, as may be necessary, and growing them steadily on in a heated pit, until such time as the weather conditions are fine and warm, when they can be grown in cold frames, taking care to afford them a fully exposed, sunny position. Allow plenty of growing space, feed liberally with liquid manure, when the pots become full of roots, and then, at the end of September, again take them under glass, into a moderately warm house, to ripen the fruit well.

The Peppers are prepared by parboiling, to assist in removing the skin; the pulp and seeds are removed, a small portion being retained for mixing with the stuffing ingredients. The latter consist of finely chopped ham, bread-crumbs, white of egg, and such seasoning as required. The stuffed pods are then fried, and the full process

completed by braising in good stock. Prepared thus they form a delectable dish. There are other ways of preparing Sweet-peppers, by frying, etc., but the foregoing is considered the best way.

*Fir Apple or Salad Potatos.*—I expect that many who have seen the groups of vegetables I have had the pleasure of staging for various R.H.S. meetings have wondered why the funny little black tuber ticketed "Potato Congo" has been included, for it really does not look edible. If, however, they saw the same potato, or the white and pink forms, cooked and added to a salad, then they would get a different impression; for these forms have the distinct and ornamental advantage of holding their colours when boiled, and form pretty additions with their pure white, pink, and blue to purple shades, and, being good and wholesome food, they should be grown more frequently for their dietetic value as salading.

*Winter Purslane.*—Another Continental salad which we do very little with, and which yet forms excellent salading, is Winter Purslane (*Claytonia perfoliata*). This can be had for winter work by protection in a frame; it is apparently more annual than the majority of annuals, for it seems to have such a short period of life at other times of the year that two or perhaps more generations of plants appear in one season, but as the days shorten and the sun becomes less powerful so the period of this plant would appear to get longer. On the Continent the crisp leaves are not only used for salads, but also as a boiled vegetable, akin to Spinach. This species sows itself, so that, as one can well imagine, there is not great trouble in raising it, rather the difficulty is to keep it within bounds.

*Chinese Radish—Winter Radish.*—I have separately named these two, though there seems to be little doubt that they are only forms of one species (*Raphanus sativus*). What I have remarked as to the many forms of Pekin Cabbage applies here equally well, for of the Chinese article the number of forms appear to be legion and they are of varying size—some, for instance, being 3 feet in circumference, others 3 feet long; some quite small in weight, whilst others reach 20 to 30 lb. They are employed for boiling, pickling, salading, drying, and I believe even for frying. It sounds strange to us to speak of frying a radish, but there is little question that this is one of the most useful foods of vegetable form in the Orient. Yet we pass it by with comparatively few words, and hardly a second glance. Personally, I consider the Winter Radish, as typified by the old Black Spanish, as of little merit; but in taking that standpoint one cannot help wondering whether one is not treating a really valuable vegetable with scant courtesy. It is easily grown, sowing the seeds at the end of July, in drills a foot apart, thinning the young plants to about 9 inches. Like most root crops it does not require very rich soil so long as it is well worked, and the resulting crops can be stored in sand until required for use.

*Rampion.*—This member of the Canterbury Bell family (*Campanula Rapunculus*) is another neglected vegetable, to my mind, for,

sown in May, in light rich soil, provided with a sufficiency of moisture in dry weather, it produces a spindle-shaped root, light in colour, and of agreeable flavour, by November. Both leaves and root are decided adjuncts to salads, and the root also forms a useful and agreeable boiled vegetable. It needs a little careful selection work for improvement in quality.

*Salsify*.—This is a little-known, though excellent root vegetable, and the probable reason for its small culture is the fact that it is somewhat exacting in its demands, especially on heavy soil. It repays good treatment, and is an excellent follow for a celery crop, as the soil is then generally in a suitable well-worked and sufficiently rich condition. The seed requires to be sown in drills about 15 inches apart, and the seedlings thinned in two stages, so as to leave the best about a foot apart. Sowings should be made about the beginning of April, and during the third week in the same month. Lift in November and store in sand. A few roots can be left in the ground, if desired, as they produce "chards," or young flower stems, in spring, which can be cut and used like Asparagus. This root, well cooked, forms, I believe, a useful accompaniment to a boiled-fish course.

*Scorzonera*.—Probably the least known of all our vegetables, yet an excellent and appreciated dish when well grown and properly served. It can be grown like Salsify, though the second week in May is early enough to sow it, and it is ready for lifting in September. It is quite hardy, and only requires to be taken from the ground when wanted for use.

*French Sorrel*.—A plantation of this, with the plants at 18 inches apart, on well-dug and properly manured ground, will give good yield for three or four years, and it is my opinion that this vegetable ought to be more extensively grown than it is. At one time a great favourite, and a vegetable that has a distinct flavour, as well as tonic properties, it is still appreciated on the Continent. Its prime use is as a salading, but the leaves may well be cooked like Spinach, and make a very appetizing dish. The ideal dish is made by boiling a mixture of half Spinach, half Sorrel.

*New Zealand Spinach*.—There are at times summers, even in this country, that are almost too hot and dry to permit the free growth of the true Spinach, and as a really first-class substitute there is nothing to beat the New Zealand Spinach. Given a warm porous soil and a sunny position, plenty to drink when drought is about, this vegetable, which we do not properly appreciate in this country, will repay these little attentions to its needs, and, lacking the slight bitterness of the true Spinach, it is very palatable to folk who do not altogether care for the other vegetable. Seed can be sown in boxes, in gentle heat, for planting out at the end of May, or may be sown in the open at the end of April in shallow drills 3 feet apart, and thinned to 2 feet 6 inches in the rows.

*Tropaeolum tuberosum*.—In France, and a very little in this country, is grown a root vegetable which, amongst the native population



of Peru, ranks second only to the potato, and it is of such nature, and growing at such altitudes, that we in this country certainly ought to take it in hand, along the same lines as the potato. *Tropaeolum tuberosum* is the delight of the gourmet in various parts of the world, and may be used in salads, or boiled as we do our familiar potato. Yield is good, it appears to be free from various pests and diseases, and, provided that it proves a success in bulk, then it should have a very big future before it. As the potato gradually forced its way along until it became one of the staple foods of the world, so I fancy there is every possibility of the "Anyu," as it is locally known, becoming equally well known as a boiling tuber.

*Yam.*—These are not unknown here, but decidedly unfamiliar to most people. Though our climate cannot be considered as an ideal one for this, yet there are years when it is a success. As the various species of *Dioscorea* are being introduced to the U.S.A. for experimental work and trial, through the splendid initiative of the Plant Introduction Bureau of the U.S. Dept. of Agriculture, so they may in years to come arrive in this country in such selected and more hardy forms that will withstand even our erratic climate. The Yam is a most important article of vegetable diet in the West Indies, South America, and Japan, and is certainly one on which we should keep our eye. It is being successfully cultivated in France, and is grown well in certain seasons in this country, as that well-known horticulturist, Dr. DURHAM, who is so deeply interested in matters such as these out-of-the-way vegetables, can show, so I think the time is not far ahead when we may see well-grown Yams of home produce offered in our shops.

## AUTUMN-FLOWERING CHRYSANTHEMUMS FOR THE FLOWER GARDEN.

By D. B. CRANE, F.R.H.S.

[Read November 3, 1925; Mr. T. HAY, V.M.H., in the Chair.]

THE theme for our consideration to-day is one in which I have taken the keenest interest for almost forty years. The Autumn-flowering Chrysanthemum for border cultivation first engaged my attention in 1886, and since that date it has absorbed much of my time. I have lived long enough to see the plant evolve from a somewhat uninteresting late summer and early autumn flowering plant into one of the most popular subjects extant. It is now regarded as a flower for the million.

In the 'eighties, the so-called early-flowering Chrysanthemums were shown by just a few enthusiastic growers who, doubtless, year after year exhibited either plants or cut flowers in the hope of encouraging their cultivation. During this period I well remember the editor of one of our now defunct gardening periodicals saying: "Take those dowdy things away." He did not enjoy the prophetic vision that some of us then had, or he would not have made such a discouraging remark.

The early autumn exhibitions of the National Chrysanthemum Society—at that time held at the Royal Aquarium, Westminster—served to encourage the cultivation of the outdoor Chrysanthemums. The Crystal Palace shows also did much to promote the popularity of these flowers amongst would-be growers.

In those early days, too, superintendents of parks and public gardens recognized, in plants bearing the small formal flowers of the Pompon type, decorative garden subjects that would withstand the trying conditions of our climate in the autumn. As, moreover, these plants were of a dwarf, bushy habit, there were many uses to which they could be put in the large beds and borders of those public open spaces under their control.

The late Mr. W. PIERCY, of Forest Hill, was a pioneer in his efforts to make the outdoor Chrysanthemum popular. He used to issue a list annually of what he described as "Early or Summer-flowering Chrysanthemums," also "Semi-early or October-blooming kinds." He also stated therein that "the sorts in this list are especially selected for growth in the open air, even in the north of the British Isles, and all such climates, for decorative plants and for the production of large masses of flowers for cutting." He went on to say that "all, or nearly all, in this catalogue are fit to bloom without any buds being picked off." He was a great believer in naturally grown, undisbudded Chrysanthemums for garden embellishment. I have always understood that

'Piercy's Seedling'—a once popular Pompon still found in many gardens—was raised by Mr. PIERCY, to whom the present generation of growers owes a deep debt of gratitude for the good "spade" work he did in his day.

Mr. NORMAN DAVIS, then of Camberwell, S.E., did much to promote the cultivation of the outdoor varieties; he used regularly to exhibit groups of these plants in pots and he grew them well.

Quite recently when looking through my collection of Chrysanthemum literature I came across a catalogue Mr. H. J. JONES issued in 1886. The outdoor varieties were there divided into "Early-flowering Chrysanthemums" and "October-flowering varieties." In the first section there were some six Japanese varieties, and in the second section there were also six varieties of Japanese origin. These facts only go to show how great has been the development since that date, although much has yet to be done before the outdoor sorts have attained the perfection desired by all practical enthusiasts. The well-known white Japan variety, 'Madame C. Desgranges,' and its several yellow sports, were practically the only varieties of this type then grown for market and in the garden, and wonderful examples of cultural skill were often seen.

In 1891 and a few years immediately subsequent thereto great developments took place, thanks to French raisers in general, and to M. SIMON DELAUX in particular. The latter made one mistake: he introduced too many novelties each year—in 1891 he distributed no fewer than 125 new seedlings—far too many for the few trade growers to deal with satisfactorily. This was the beginning of better times, however, and in consequence Chrysanthemums were more frequently seen in the flower garden. It was M. SIMON DELAUX who in 1894 gave us the popular variety 'Madame Marie Masse.'

By a strange coincidence, cuttings of this variety came into my possession in the spring of that year, and in the autumn the resulting plants were a mass of flowers. So excellent was the habit of the plant, and its free-flowering propensity so pronounced, that I felt it ought to be submitted to the Floral Committee of the National Chrysanthemum Society. Accordingly, a plant was duly submitted to that Committee, and a First-class Certificate was awarded to the variety. This variety and its sports, of which there are eight quite distinct, and several others that are practically synonymous, have done more to popularize the outdoor sorts than perhaps many growers are aware. The varieties 'Horace Martin,' yellow, and 'Crimson Marie Masse,' bronzy chestnut, are the best of these sports; they are still grown in immense quantities for market and in the flower garden.

The variety 'Madame Marie Masse' and its sports are generally spoken of as the 'Masse' family. The Masse family, in positions that suit them, are still a valuable series, but in some gardens they are a failure—more or less—especially in wet weather. Some growers find that varieties belonging to this family cannot always be relied on for early flowers. In spite of the large number of new varieties emanating

from other sources, they are still grown in such huge quantities that there must be some merit in the Masse family which some of the newer varieties do not possess. I have seen wonderful plants grown from old stools divided up in the spring; cuttings do not appear to give the same excellent results. The Masse family are in a category quite by themselves; the flowers are not of the best, but the plants are very free-flowering and hardy, possessing a wonderful constitution, and generally can be grown anywhere. Although they possess an ideal habit, some growers to-day complain that their one fault is lack of bright colours, but this is, I think, hardly just. A friend of mine, a well-known raiser of new Chrysanthemums, in discussing with me the merits or demerits of the Masse family, said he had discarded them long ago. He went on to say: "If left to themselves, as they are generally, they are awful stuff." Yet in proof of their popularity with growers, he said, "I was in North Staffordshire on Sunday, October 4, and saw endless bunches being taken to church." What better evidence of their value could be tendered?

In my opinion, no garden should be without a few of the better varieties of the Masse family, and I would heartily recommend 'Horace Martin,' yellow; 'Crimson Marie Masse,' bronzy chestnut; and 'White Masse,' creamy white.

For some years subsequent to the introduction of the Masse family it was possible to trace in the new varieties sent out from time to time the pronounced characteristics of the Masse type of plant.

Other raisers, such as Messrs. NONIN, GOACHER, DAVIS, JONES, WELLS, and GODFREY, have done much in the past to develop the autumn-flowering Chrysanthemum for the flower garden; many varieties raised by these men are doubtless largely responsible, by the lead which they gave the present-day raisers, for the happy position we are in to-day.

But are we really making the advance in the development of the border Chrysanthemum that might be reasonably expected? I have been in communication with several of my friends who, as raisers, have devoted much time to this aspect of the question. One man, whose judgment I usually respect, states that he cannot say that the last ten years have seen much advance. Another friend, whose opinion I have always valued, says: "Progress has been more apparent than real. There has been steady advance for many years. October or semi-early sorts certainly show progress." With this opinion I am absolutely in accord. Another raiser, who during recent years has raised many noteworthy varieties, is of the opinion that "advance has certainly been made both in the type of flower and in colour." He holds the view that some raisers will not send out a new seedling unless it is an improvement on older varieties. Such a view is one that all growers would heartily commend, but, unfortunately, opinions in regard to improvement differ widely. I must, however, confess to a liking for the statement of one very well-known raiser who says that "the test of progress of new varieties is to grow the plants

without disbudding, and just to tie the growths to a stake." This is the test he gives his novelties.

My criterion of a real autumn-flowering Chrysanthemum for the flower border, provided, of course, the colour is agreeable, is as follows : First and foremost, habit—by habit I mean that the branches should break out regularly from the stem like a candelabrum, the growth as a whole forming a plant of bushy character. The constitution must be such as will withstand the rigours of our British climate during the winter season. The leaves should be rather small on a wiry flower-stalk. The florets should be crisp and of good substance, denoting that they are not prone to damp off. I am aware this is setting a somewhat high standard, but we are gradually reaching this standard, and it is only a question of time before it will be attained by raisers.

Colours should be pure bronzes, red and yellow, not brown, but yellows clear or golden, not tawny. Pink colours should be either rose or paler pinks, not flowers with mauve or somewhat similar tones of colour. I understand raisers find pure pink colours are the hardest to get.

For decorative effect in the garden, spray varieties are generally regarded as the best. By the term "spray" I mean varieties that do not need to be disbudded, but which produce pretty sprays of blossoms quite naturally without disbudding. Ideal plants are those about  $2\frac{1}{2}$  to  $3\frac{1}{2}$  feet high, with flower stems at least 18 inches long, straight, slender (or wiry), having small foliage and carrying about six flowers at a time, all well displayed. The flowers must not be susceptible to damp and must possess stiff florets. Unfortunately, there are not many varieties with such characteristics, but raisers will get them in time, especially those raisers who are working on well-defined lines. Flowers having reflexed florets certainly have advantages, as they throw off rain and moisture so much better than those flowers having incurving florets, however slight the tendency to incurve may be. Some raisers are endeavouring to produce varieties the plants of which form an almost flat head of flowers opening practically altogether. This may be a great desideratum for plants grown for market purposes, where a mass of flowers may be gathered within a very limited period. But in the case of plants grown for garden embellishment, it is surely better that they should commence to flower early and continue to flower over as protracted a period as possible, and not flower in one brief spasm only at the top.

Flowers of outdoor Chrysanthemums are often submitted to the Floral Committee of the Royal Horticultural Society and receive an Award of Merit. It is well to remember that such flowers often present a fine appearance ; doubtless the plants have received special treatment and all too often have been grown under some kind of protection. Then, too, the sprays of those blossoms on exhibition have been carefully selected from many others. Purchasers of such novelties should bear these facts in mind, as it is not improbable that the results in their own gardens will be less satisfactory.

For the purposes of this lecture, I have defined the autumn-flowering Chrysanthemums suitable for the outdoor garden as those plants that come into flower during September and continue their display during October, and, in specially protected situations, for a few weeks longer. Seldom do Chrysanthemums continue to blossom satisfactorily outdoors in the British Isles after October, although when planted in borders under a wall, fence, or hedge, with a southern aspect, the plants may give an excellent account of themselves, should the weather not be too cold.

Early-flowering Chrysanthemums are seen to disadvantage when they come into flower unduly early; their advent seems to anticipate the autumn season, a season which most flower lovers like to defer as late as possible. Chrysanthemums that flower in the outdoor border in late summer have to compete for favour with Roses, numerous hardy flowers, and new types of the Dahlia, all of which are now represented by flowers of the most gorgeous hues and in forms pleasingly diverse. Beautiful though Chrysanthemums undoubtedly are during the autumn months, they lack the brighter colours seen in so many of the more popular summer-flowering plants of the garden. They come into their own, however, in their true flowering season, when other less hardy subjects either are cut down by early frosts or present a bedraggled appearance due to inclement weather conditions.

The Dahlia is the autumn-flowering Chrysanthemum's most serious rival; it has been vastly improved, both in colour and form, in recent years, and the colours are rich, bright and varied. Unfortunately for growers of the Dahlia and for those who are dependent on its display in the garden during the autumn, a few degrees of frost at once brings to an end its glorious display, whereas the outdoor Chrysanthemums continue; for they withstand more serious frosts without apparent harm. It is just here that their value becomes most pronounced. I have often seen Dahlias blackened and irreparably damaged by frosts in mid-September, thus prematurely cutting short their usual period of flowering, whereas, during the same climatic experiences, the Chrysanthemums have passed through the ordeal practically unscathed, and in open weather have continued to blossom outdoors until the end of October, and even much later.

Quite recently a well-known raiser and grower agreed with me that the outdoor Chrysanthemums had long since passed over the border-line of what could be regarded as early-flowering varieties, that is, such as could be depended on to flower before the hard frosts spoiled their display. If some of the fine varieties of recent introduction could always be relied upon to flower before frosty weather destroyed them undoubted progress would be indicated. Chrysanthemums of this type old Mr. PIERCY described as "Semi-early."

If I were asked to name a dozen varieties to follow on after the generally recognized early-flowering kinds, these newer semi-early sorts would have their chance; it is this fact that should be impressed upon those who desire to extend the flowering season of the Chrysanthemum

into the late autumn, and it is in this way that the relative values of the two sections could be understood.

I have dealt with progress as regards the flowers, but much greater progress has been made in the popularity of the border Chrysanthemums. Until quite recent years it was a matter of some difficulty to persuade owners of large gardens to grow these plants in quantity ; they are now largely grown everywhere. Enthusiasm for the subject alone does not suffice to promote its progress ; it is the utilitarian aspect that is and must be of paramount importance. The practical side must be more seriously regarded, as it is there that complaints have originated. This fact applies more particularly to the novelties, many of which, after being put to the practical test, are found useless. It is for this reason that large growers are so chary in purchasing novelties, preferring rather first to test them before growing them in large quantities.

The trial of early-flowering Chrysanthemums at Wisley in 1923 was valuable in several respects, but chiefly because it demonstrated the usefulness of these plants for border cultivation when grown in natural fashion and not disbudded. It was unfortunate, perhaps, that the climatic conditions during that year were so abnormal. Cold weather, with sharp frosts in the early days of May, made the planting conditions most uncongenial, and early frosts in the middle of September, when the plants should have been in their most promising form, deferred the period of flowering and made the trial less interesting in consequence. It is gratifying to record that the weather subsequently improved and that the flowering of the plants continued until the end of October, or rather later.

This trial served a very useful purpose, as it gave prominence to varieties of proved merit, which were either given an Award of Merit or were Highly Commended. The selected varieties are mentioned in Vol. 49, Part I., of the JOURNAL of the Society, to which reference may with advantage be made. The fact that no fewer than some 270 varieties, represented by 453 stocks, were planted is conclusive proof of the value of this trial. It is interesting to note that about half the number selected for awards were old varieties to which awards had previously been made and that the remainder were nearly all new introductions.

Opinions differ as to the best period for propagation. For ordinary purposes an excellent time to insert the cuttings is during the latter half of February and the earlier part of March. At that period the basal shoots from which the cuttings are prepared are in good order and condition, and the rooting process subsequently is of short duration. Plants resulting from this late winter or early spring propagation invariably grow away quite freely, and produce nice, sturdy plants for planting outdoors in their flowering quarters in May.

A system of dealing with rooted cuttings which commends itself to most practical growers is that of planting them out in cold frames, in rows six inches apart, the beds of soil being specially prepared for their reception. If the rooted cuttings be planted firmly they quickly become established, so that it is possible to open the frame-lights in a few days

to admit air, and in due course, when all risk of frost is past and genial weather prevails, to remove the frame-lights entirely. In this way sturdy plants are brought into being, and these may be lifted during the earlier half of May with a mass of roots, for transference direct to their flowering quarters. This is a very simple method of raising these outdoor Chrysanthemums in quantity, and is far more satisfactory than the coddling treatment usually given in the past. Growers who need only a few plants should insert the cuttings around the edge of three-inch or five-inch pots, carefully labelling each variety to avoid confusion later. If more convenient, quite a large number of cuttings, inserted in rows, may be accommodated in a shallow box, care being taken, however, first to insert a label with the name of the variety legibly written thereon. When well rooted, these cuttings should be potted up individually into small pots or be planted out three inches, more or less, apart in other boxes of deeper construction.

In the selection of varieties it is well to remember that only varieties of proved merit should be grown. Indifferent varieties require just the same amount of time and attention as those possessing an excellent record; it should, therefore, be quite obvious which sorts should be grown. I have, in earlier days, come into conflict with certain trade growers because I used to recommend the planting of outdoor Chrysanthemums about the third week in May. In my experiences the foliage of the plants was blown about and damaged by rough weather experienced in late April and early May, much to their detriment. I have invariably found that the third week in May is a safe period for the planting to be done. The trade specialist is naturally anxious to distribute his Chrysanthemums in order to accommodate other plants in his cold frames; this may be the reason for some specialists advising an earlier period of planting.

Autumn-flowering Chrysanthemums for the flower garden should, of course, be planted with the object of producing the best effects during the periods already mentioned. With this object in view I strongly urge the planting of individual varieties in groups of three or more plants in each group, arranged in triangular form or in some other manner. In this way much the best effects are obtained. This can be done quite easily in large gardens and also in those of moderate proportions. In small gardens, however, it is not so easy, although I would be disposed to grow fewer sorts and to group these effectively. In large gardens it is a good plan to plant a number of beds each of one variety; I have seen this done with some success even in suburban gardens. Beds of one variety are often "a thing of beauty" for several weeks in the autumn, and this at a time when there is little else of interest in the way of flowers in the garden. To plant in this way successfully, it is necessary that the colour of the flowers should be properly determined and the character and height of the respective plants be first ascertained.

The hardy border may be made bright and most interesting by planting groups of Chrysanthemums alternately with some of the better Michaelmas Daisies. The latter are always to be found in the hardy



border, as they take the place of other hardy plants that have flowered earlier in the season. These Chrysanthemums, when contrasted with the perennial Asters, maintain interest in the hardy border over quite a long period, and in their season they do, indeed, "come as a boon and a blessing."

If possible, quarters in the garden should be arranged where plants can be grown for providing cut flowers for home decoration. Even when grown in this fashion the flowering quarters are of the greatest interest. Chrysanthemums grown for cut flowers in the manner suggested should be arranged in rows, three feet apart, and from two to three feet—more or less—between the plants in the rows. This arrangement ensures the proper development of the plants; it also enables the grower more easily to attend to their cultivation. I have seen the autumn-flowering Chrysanthemums planted in this manner in numerous small gardens and in allotment gardens throughout the country doing exceptionally well and providing an abundant supply for several months of beautiful sprays of blossom for decorative uses. The growers of such plants invariably take full advantage thereof by cutting the flowers and making posies for themselves and for their friends and neighbours.

A weekly hoeing between the plants aerates the soil and promotes growth, and, incidentally, keeps under weeds which will quickly develop unless such methods are observed.

Many people make the mistake of providing flowering quarters in which the soil is over rich. In such quarters the plants become unduly tall and somewhat out of character. Any ordinary garden soil will answer quite well, provided it has been deeply dug, or, what is better, trenched.

The addition of bone meal to the soil, at the rate of 4 oz. to the square yard, or 8 lb. to the square rod, when the flowering quarters are dug over during the autumn or winter, is all that is necessary in the way of additional (plant) food for these plants, unless the soil is very light and sandy, in which case well-decayed manure, preferably cow manure, may be dug in with advantage. A fact to be remembered is that heavily manured soil invariably promotes coarse, undesirable growth.

The plants should be staked in good time, certainly before they begin to grow freely. One tie should be made immediately below that part of the stem where the branching growths are evolved, and subsequently the branching growths themselves should also be looped to stakes. Under no circumstances should plants be tied tightly. The stakes should be of a length to suit the height of the respective plants and should be strong enough to be dependable. Bamboo stakes, which may be obtained in varying diameters, are best suited for staking outdoor Chrysanthemums, and they have the advantage of lasting several years. Care should be taken to see that the stakes do not obtrude from the mass of blossoms at the crown of the plant, as this defect largely detracts from the charm of the picture when the plants are at their best in the flowering season.

The classification of outdoor Chrysanthemums appears to be very

necessary. For instance, varieties required for the flower border should be represented by plants from 2 feet to 2½ feet, or rather more, in height, of bushy habit and with strong upright growths, which produce flowers in abundance on stiff, erect stems. There are many beautiful varieties that attain this standard and are proof against rough and stormy weather, such as is usually experienced towards the end of September when the border Chrysanthemums are at their best. I would take as a type for this section the variety 'Polly' and its sports, as they are so well known. This I would describe as *Section 1*, and call it the dwarf border section. A good selection is as follows:—

Alexander McAlpine	golden orange, shaded bronze, large reflexed, very free. September.
Abercorn Beauty	bronze, sport from 'Polly.' 2 feet. August to September.
Polly	orange, flushed red. 2 feet. August to September.
Dick Barnes	rich burgundy, very distinct, good habit. 2 feet. September.
Florrie Wilkinson	sport from 'Polly,' same colour, but stronger grower. 2 feet. August to September.
Harrie	bronzy orange. 2 feet. August to September.
Lillie	pearl pink. 2 feet. Flowering late September to October.
Provence	light rose pink. 2 feet. September.
Verona	bright terra-cotta red. 2 feet. August to September.
Low's White	pure white. 2½ feet. September to October.
Harry Thorpe	orange yellow, fawn centre. 2½ feet or rather less. August to September.
Leslie	bright yellow. 2 feet. August and early September.
Sanctity (syn. Candida)	very fine, pure white, dense habit, free-flowering. September.

#### *Section 2.*

Then there is a section of sorts of taller character, useful alike for border culture and for cut flowers. These plants vary in height between 2½ and 3½ feet. Most of the varieties enumerated below are ideal for these purposes, and the flowers may be cut with good long stems for decoration.

Goacher's Crimson	dark crimson, with bronze reverse. 2½ to 3 feet. August to September.
Bronze Goacher	bronze, sport from Goacher's Crimson. 2½ to 3 feet. August to September.
Almirante	red, shaded scarlet. Beautiful form. 3½ feet. September to October.

Alcade	bright rich crimson, sport from <i>Almirante</i> . 3½ feet. September to October. This variety is also known as 'Red <i>Almirante</i> .'
Phoenix	a beautiful addition with small, well-formed flowers similar in colour to 'Red <i>Almirante</i> .' 3½ feet. September to October.
Normandie	light pink, very free. 2½ feet. August to September.
Bronze Normandie	useful orange-bronze, sport from 'Normandie.' 2½ feet. August to September.
Royal Salute	a useful bright terra-cotta novelty. Medium sized flower. 2½ to 3 feet. September.
September White	very free-flowering white variety, rather large flowers, stout stems. 3 feet. September to October.
Goldfinder	beautiful free-flowering, bright golden-yellow sort, also known as 'Hollicott Yellow.' 3 to 3½ feet. September to October.
Harvester	golden yellow, faintly tinted bronze, sport from 'Hollicott Yellow.' Also known as 'Hollicott Bronze.' 3 to 3½ feet. September to October.
Perle Chatillonnaise	cream, shaded pink. Very dainty. 3½ feet. September to October.
James Bannister	deep yellow, flushed red, sport from 'Perle Chatillonnaise.' 3½ feet. September to October.
Roi des Blancs	early and most useful, small, free-flowering white, rather slender habit. Beautiful for cut flowers. 3 feet. July to September.
September Yellow	bright canary yellow, sport from 'September White,' rather large flowers on stout stems. 3 feet. September to October.
Lichfield Purple	bright amaranth purple. 3½ feet. September.
Mrs. J. Fielding	the true stock of this variety is bright bronze. 3 feet. September to October.
Mrs. Jack Pearson	a variety not yet in commerce; beautiful bronze. 3 feet. September to October.
Framfield Early White	pure white, very free and hardy. 3 feet. August to October. Must be disbudded.
Lichfield Pink	deep mauve pink, good habit, fine flowers. 2½ to 3 feet. September.
Madame E. David	a good lilac pink. 3½ feet. September.

### Section 3.

Plants within this section give better results when they are disbudded; they invariably yield large, handsome flowers.

Sanctity (syn. *Can- dida*) pure white. September.

Cranfordia	golden yellow. October.
Pink Delight	pretty shell-pink. October.
Blanche du Poitou	pure white. October.
Almirante	red, shaded scarlet. September to October.
Alcade	bright rich crimson. September to October.
Perle Chatillonnaise	cream, shaded pink. September to October.
James Bannister	deep yellow, flushed red, sport from 'Perle Chatillonnaise.' September to October.
Bronze Cranfordia	bronze, sport from 'Cranfordia.'
Mrs. G. Hutt	crimson and gold. September to October.

Newer border varieties of proved merit are quite numerous ; some of the better sorts are the following :

Royal Salute	bright terra-cotta. (Already described.)
J. Rotherham	cerise and salmon shades of colour. September.
Tarzan	light pink, large. $3\frac{1}{2}$ feet. August to September.
Lichfield Bronze	bright chestnut bronze. $3\frac{1}{2}$ feet. August to September.
Alexander McAlpine	golden orange, shaded bronze. September.
Charlotte Harley	scarlet crimson, golden reverse. August to September.
Mrs. Jack Pearson	beautiful bronze, persistent bloomer. July to October.
Bronze Early Buttercup	bronze. September to October.
Wembley	dark crimson. September to October.
Brightness	bright crimson red. September to October.
Golden Almirante	golden yellow, sport from 'Almirante.'
Lichfield Peach	novel almond blossom colour. Very beautiful. 3 feet. September to October.

Many very excellent additions have been made during the current season, showing wonderful advance, notably 'Crimson Circle' (crimson self), 'Pink Dame' (pink, good for sprays), 'Afterglow' (pure terra-cotta), 'Gold Dame' (golden yellow), and 'Cranford' (a glorious free-flowering golden yellow), all flowering in September to October.

#### *Single-flowered Varieties.*

There is abundant evidence of advance in this section. The singles were a long time making progress, because the flowers were mostly very flimsy. The earlier forms made a good show while the weather was good, but with the least shower of rain or a suggestion of frost they looked like rags, and many sorts were also of weak growth. Several of the newer introductions are great improvements.

One of our most successful raisers says: "The singles are becoming very popular in the garden, and the latest acquisitions are those raised from double flowers." He also says that "this is the secret of getting good singles; they possess a good constitution and habit; if raised from singles they soon lose their vigour." Another raiser unhesitatingly

says: "The singles have been improved out of all knowledge. Now we have varieties which develop nice open sprays, and flowers of useful size with stiff florets." For cut flowers they are much better when slightly disbudded.

The better single-flowered sorts are the following:

Shrapnel	orange, shaded terra-cotta. 2½ feet. September.
Doreen Woolman	golden flame. 3½ feet. August to September.
Nestor	deep almond pink, very fine. September to October.
Delice	rich, bright pink, large flowers. 3½ feet. September to October.
Orange Girl	bright golden orange. 2½ feet. August to September.
Chieftain	deep crimson, long stems. 3 feet. September.
Firebrand	beautiful chestnut. September to October.
Yellow Firebrand	golden yellow, sport from 'Firebrand.' September to October.
September Gem	rich pure golden orange. September to October.
Midnight Sun	clear terra-cotta. 2 feet. August to September.

The once popular Pompons have lost their popularity, and very few of them are now called for. As a matter of fact, they are seldom met with in gardens at the present time; older varieties are dying out and few new ones are added. In comparison with other types of early Chrysanthemums for the outdoor border they are generally more or less unsatisfactory, and very little enthusiasm is now shown in them. It does not pay the specialist to catalogue them. The following sorts are still interesting and useful:

Crimson Precocite	crimson. October.
Little Bob	very small, crimson-brown flower. July to September.
Craigmillar	rich yellow, very free.
Orange Pet	a hybrid Pompon. Orange. September.
Alice Butcher	reddish orange. September to October.
Lyon	rosy purple. September to October.

You may be interested to be advised of the names of the varieties of early flowering outdoor Chrysanthemums selected by Members of the Wisley Garden Committee at the time they saw the plants in the trial at their best. They were as follows:

<i>White varieties</i>	September White. Candida.
<i>Pale yellow</i>	Framfield Early Primrose.
<i>Yellow</i>	Hollicott Yellow (syn. Goldfinder). Horace Martin. Golden Almirante.

<i>Bronze</i>	Mrs. Jack Pearson. Bronze Goacher.
<i>Chestnut</i>	Red Almirante (syn. Alcade).
<i>Pink</i>	Normandie.
<i>Purple</i>	Lichfield Purple.

The foregoing varieties I have already mentioned, with their period of flowering and height.

Chrysanthemums that come into flower at a period later than those varieties enumerated I hesitate to mention, as the chances are that the uncongenial character of our British climate may irreparably damage the plants before the flowers are fully developed. There are gardens, however, having specially sheltered quarters, and in such positions the later autumn-flowering Chrysanthemums occasionally do well, and very welcome indeed is their display. The following varieties are suitable for such late displays :

Pink Delight	pretty shell pink.
Uxbridge Pink	rosy pink, well-formed flowers, dwarf.
Uxbridge Bronze	rosy bronze, very good dwarf.
White Quintus	white, free-flowering.
Cissbury Pink	salmon pink, in sprays on rigid stems. 4 feet.
La Triumphant	rose, shaded white.
Red Dragon	bright red, free-flowering.
Kathleen Thompson	rich crimson-red, tipped gold.
Soleil d'Octobre	canary yellow.
Source d'Or	rich terra-cotta.
Lizzie Adcock	rich yellow, sport from 'Source d'Or.'
Armored	coppery-bronze, large flowers.
Bouquet Rose	bright rose.
Jean Pattison	bright rich bronze. A very dependable sort.
Mrs. Marshall Field	Hydrangea pink, good in sprays.
Pink Spray	beautiful pink.

## GENETICS OF THE WISLEY BLUE PRIMROSE.

By B. BUXTON, F.L.S.

IN 1920 some plants of the 'Wisley Blue' primrose were crossed with yellows. Unfortunately a number of the seedlings were lost in the drought of 1921, but twenty-four plants survived, all of them having red flowers.\*

Seedlings were raised of these hybrids and of other crosses in an endeavour to discover the relations of the colour forms to one another. In order to show the steps by which the final conclusions were arrived at, the experiments and the conclusions drawn from them are given in chronological order. As will be seen, the earlier conclusions had to be somewhat modified later on, especially as regards the blues.

In 1922 some of these  $F_1$  plants were selfed or crossed with each other; and by the spring of 1924 they had all flowered.

Four hundred and fifty-six plants were raised with the following results: blue, 28; red, 294; yellow, 113; white, 21.

If Y is taken as factor for the yellow flavones, and B as factor for the anthocyanins, the constitution of the  $F_1$  plants would be  $BbYy$ , and the expectation for  $F_2$ : blue ( $By$ ), 85.5; red ( $BY$ ), 256.5; yellow ( $bY$ ), 85.5; white ( $by$ ), 28.5.

The number of blues, however, is much less than the expectation. On the other hand, a considerable number of those classified as reds had a distinctly bluish tinge, and could be called bluish-red or lilac.

It seemed probable, therefore, that the true blue colour only shows when homozygous for B, and in this case for 456 plants the results are:

TABLE I.

	Expectation.	Observed.
<i>Blue</i> ( $BByy$ ) . . . . .	28.5	28
<i>Blue-red</i> ( $Bbyy$ )	313.5	294
<i>Red</i> (Combinations of B and Y)		
<i>Yellow</i> ( $bbYY(y)$ ) . . . . .	85.5	113
<i>White</i> ( $bbyy$ ) . . . . .	28.5	21
	456	456

The observed agrees fairly well with the expectation; and to test the point further a back cross of  $F_1$  (presumably  $BbYy$ ) was made with

\* MR. J. CHITTENDEN, of the John Innes Horticultural Institute, tells me that he crossed a blue primrose with a yellow, and raised about 100 seedlings, all of which were red, but he did not continue the experiment with an  $F_2$ .

a white (bbyy), the expectation being equal numbers of blue-red (Bbyy), red (BbYy), yellow (bbYy), and white (bbyy).

Two crosses were made and 320 seedlings raised.

TABLE II.

	White ♀ × F <sub>1</sub> ♂.	F <sub>1</sub> ♀ × White ♂.	Total Observed.	Total Expectation.
Blue-red } . .	81	84	165	160
Red } . .				
Yellow . . .	31	39	70	80
White . . .	40	45	85	80
	152	168	320	320

The observed is remarkably close to the expectation.

One cannot distinguish accurately between the blue-reds and the reds, as the shades merge into each other; but of 102 plants in full bloom and massed together, 50 were reckoned as red and 52 as blue-red, so that the proportions of blue-red and red must have been approximately according to expectation, and the results indicate that the hypotheses deduced from the F<sub>2</sub> are correct.

#### *An Intensifying Factor.*

On examining the blues of the F<sub>2</sub>, it is found that there are three distinct shades—dark, medium, and light, approximately in the proportions of 1 : 2 : 1—and among the reds the varying shades are much more numerous than can be accounted for by varying proportions of B and Y alone. An intensifying factor N can therefore be postulated, the darker shades of blue and red being homozygous (NN) for the intensifier, the medium shades heterozygous (Nn), and the lighter shades without intensifier (nn). The yellows show some differences of shade, but not more than can be accounted for by YY or Yy, and it seems probable that the intensifying factor has no influence on the flavones, but only on the anthocyanins.

Postulating therefore the three factors, B, Y, and N, and the F<sub>1</sub> as Bb, Yy, Nn, there are in F<sub>2</sub> three shades for the blues, three for the blue-reds, and twelve for the varying combinations of B and Y, forming the reds.

If the blue-reds and reds are classified together as reds, there are fifteen possible shades of red, which, with minor variations due to environment, are quite enough to account for all the variations of that colour found in gardens, and met with in F<sub>2</sub>.

The results of the crossing F<sub>1</sub> × white, with the consequent reds and blue-reds in approximately equal proportions, indicate that in the blue-reds the yellow factor Y has been eliminated, and their constitution to be Bbyy. To make sure that this is the case, several crosses



were made among the blue-reds, the expectation for  $Bb \times Bb$  being : 1 blue (BB), 2 blue-reds (Bb), 1 white (bb).

In the following table and explanations no distinction will be drawn between the reds and the blue-reds. They will be classed together as reds, unless there is some special reason for distinguishing between the two.

TABLE III.  
*Crosses between Red (Bb) and Red (Bb).*

Cross.	Blue.	Red.	White.	Yellow.	Total.
1	1	9	4	0	14
2	0	62	18	2	82
3	0	56	14	0	70
4	0	53	23	0	76
5	10 (?)	49	22	1	82
	11 (?)	229	81	3	324

	Expectation.	Observed.	Expectation.	Observed.
Blue . .	81	11 (?)	} 243	240
Red . .	162	229		
White . .	81	81	} 81	84
Yellow .	0	3		
	324	324 ?	324	324

On examining Table III. the first point to notice is that the yellows have not been entirely eliminated, but it is probable that on one or two occasions the pollen of a  $BbYy$  plant has been used in mistake for that of a  $Bbyy$  plant. As already mentioned, a hard and fast line cannot be drawn between the reds and the blue-reds, and such a mistake may easily have been made in the case of Cross 2 (2 yellow), in which pollen from several different plants was used. In the case of Cross 5 only one ♂ plant was used, and the single yellow observed was probably due to accidental contamination. However this may be, the yellows can fairly be classed together with the whites for comparison with the blues and reds. Any slight possible error on this account would be negligible.

Taking, then, the whites and yellows together on the one hand and the blues and reds together on the other, the results are according to expectation. The blues, however, fall far below expectation, and in three of the crosses do not appear at all.

It seems necessary to postulate a second determining factor, D, and to suppose that a blue flower must be homozygous for both B and D. Leaving the intensifying factor out of the question, since this only affects the shade and not the colour, the constitution of a blue flower would be BBDD. If we go back to the original  $P_1$  cross we can see

how the D factor may have been eliminated from some of the blue-reds before they were crossed with each other:

$$\begin{array}{c} P_1 \text{ Blue (BBDDyy)} \times \text{Yellow (bbddYY)} \\ | \\ F_1 \text{ Red (BbDdYy)} \end{array}$$

and on crossing the  $F_1$  with white (bbddyy), one half of the progeny would be heterozygous for D, and in half of them D would be absent.

In Cross 1 (Table III.), with one blue to four whites, probably both parents were BbDd, and in this case the expectation for sixteen plants would be 1 blue, 11 reds, 4 whites, since D alone without B would be white.

Of fourteen plants there are actually 1 blue, 9 red, 4 white; very near the expectation, although the numbers are too few to place much reliance on the results.

In Crosses 2, 3, 4 (228 plants), there are no blues. In these crosses one parent must be without the D factor, and the other either Dd or dd. Crosses 1-4 were all made with rather pale blue-reds from the cross  $F_1 \times$  white.

Cross 5, ♀, was the deepest blue-red that could be found from the Cross  $F_1 \times$  white, but the ♂ was a very dark supposed blue taken from the  $F_2$  of the original cross. Later flowerings, however, and the results of Cross 5, proved it to be in reality a dark blue-red, and it was probably homozygous for D, with the constitution BbDD, since the number of blues in Cross 5 is fairly large. The ♀ plant would then be BbDd, and the expectation in this case for eight plants would be: blue, 1; red, 5; white, 2; and the results with eighty-two plants flowered:

Expectation . . .	Blue, 10.25	Red, 51.25	White, 20.50
Observed . . .	„ 10.00	„ 49.00	„ 22.00

but the number of blues is rather doubtful, and some may prove to be blue-reds. A (?) has been put in after the blues in Table III. to indicate this uncertainty.

It would appear from the foregoing as if the number of blues (28) in the  $F_2$  of the original cross must have been overestimated, and this indeed was found to be the case, for some of them on flowering a second and third time could no longer be called blue, and one of them in particular taken for Cross 5, as mentioned, proved by culture also to be a blue-red. The exact number erroneously thought to be blue, however, cannot now be determined, but theoretically there should have been seven blues to twenty-one pseudo-blues among the twenty-eight plants.

What, then, is the significance of this determining factor D? It will be shown in another paper—worked out in collaboration with Dr. F. V. DARBISHIRE, but not yet published—that the reaction of the sap of the primrose flower is about neutral (pH7). The anthocyanins are blue in neutral or slightly alkaline solutions, and red in slightly acid solutions; and it is suggested, in the paper mentioned, that the

anthocyanin pigments in the cells of the petal, varying from red to blue, are due to selective permeability of the cell membrane, the red cells excluding the K ions or other alkaline ions of the sap, and the blue cells admitting them.\*

Accepting this point of view, it seems reasonable to suppose that the blue cells have become weakened in some way, and in consequence have lost the power of excluding the K ions.

Since the natural colours of the primrose are yellow or red, and the blues now cultivated in gardens are a recent mutation, so far as is known, the weakening is probably pathological, the germ cells having become damaged in some way owing to overstimulation in cultivation. The factor D therefore might be allowed to stand for "Damage to the germ cell," instead of the vaguer "Determining factor."†

In support of this view it may be remarked that red primrose petals when much weathered often take on a bluish tinge. A rather striking analogous instance of this may be seen in the early (March) flowering *Primula denticulata*. If there is a favourable spell of weather as the flowers are opening, they are all pink. If, now, the weather changes suddenly and there is a hard frost in the night, the next morning the flowers are all blue.

In these two cases the blue tinge is transient, due to transient environmental conditions, whereas in the blue primrose the blue is permanent, due to permanent germ damage; but the immediate cause of the blueing itself is always the same, i.e. weakening of the selective permeability of the cell.

Perhaps it would be better, instead of using a factor D for germ damage, to take a factor S or P to indicate "Selective Permeability." The reds would then have the constitution SS or Ss, and the blues ss, or loss of selective permeability. In this way it is made to appear more clearly that the mutation to the blue is due to loss of a factor and not gain of an additional factor.

Loss of such a factor S, however, does not of itself entail complete loss of selective permeability, since there is still a reddish tinge in the flowers of constitution Bbss, and the presence of Y also, combined with B, always appears to produce a red, whether the S factor is present or not. Even in the best blues of presumed constitution BBss there are always some red cells present, especially on the underside of the petals.

Certain other colour crosses have been made, of no particular value in themselves, but they all tend to support the views arrived at by the methods given here in detail.

### Summary.

Two main factors may be assumed for the colours of the primrose, a factor Y for the yellow flavones, and another B for the anthocyanins.

\* STILES, "Permeability," 1924. Stiles does not deal with colours, but shows how cells in general may possess selective permeability.

† MCBRIDE, "The Recapitulation Theory," *Science Progress*, Jan. 1926, and other papers.

The factor B is absent from the yellow flowers, and the factor Y is absent from the blue flowers. The absence of Y of itself, however, is not sufficient to produce a blue flower.

Anthocyanins are blue in neutral or slightly alkaline solutions, and red in acid solution. The sap of the primrose is approximately neutral, and the colour of the red primrose is due to selective permeability of the cell membrane, the membrane being permeable for H ions, but not for K or other alkaline ions. For the selective permeability a factor S is assumed, which must be eliminated, as well as the factor Y, before the blue colour becomes evident; and for the really blue flowers the factor B must be homozygous. The constitution of the blue primrose therefore is BByyss.

In addition to these three factors there is also an intensifying factor N, which does not affect the colour but only the shade.

## NOTES ON THE NEW ZEALAND VERONICAS.

By H. W. LAWTON, B.A., F.R.H.S.

THE outstanding feature of the New Zealand flora is the genus *Veronica*. It is by far the largest genus of flowering plants in the Dominion, and is often the predominant feature of the sub-alpine portion of the country.

The late Mr. T. F. CHEESEMAM, in his endeavour to reduce the number of species, frequently grouped plants which were really deserving of specific rank.

For example, he placed vars. *stricta*, *gigantea*, and *Kirkii* under the head of *V. salicifolia*, and vars. *affinis*, *latisejala*, and *crassifolia* under *V. macrocarpa*.

Even under this grouping he admitted 84 species, of which 81 are endemic in New Zealand. Of the remaining three, *V. Anagallis* was found about sixty years ago, and never since. As this species is common in Europe, it may be dismissed as an introduced plant. The remaining two are: *V. elliptica*, found in the Falkland Islands and Tierra del Fuego, and *V. plebeia*, found in Eastern Australia.

The study of Endemism has received considerable attention in New Zealand, but the problems of Relict Endemism and Initial Endemism remain unsettled. If shrubby Veronicas were found in no other country it would undoubtedly be a case of Initial Endemism—the species developed here owing to special environmental conditions. But the presence of two species in other countries would point to Relict Endemism, where the species were once widely spread, but, from an altered environment, have almost entirely died out elsewhere. The latter seems to be the better conclusion for at least three reasons.

1. Geologists are agreed that New Zealand is a fragment of a previous extensive land mass which stretched as far as the outlying islands, the Chathams, Snares, Auckland and Campbells, etc. Veronicas are found on all these islands.

2. South America would thus be much nearer to New Zealand than at present, and the two countries were connected by a chain of islands, which would account for the presence of *V. elliptica* in Fuegia and the Falklands.

3. At least six of the European herbaceous Veronicas are strongly established in New Zealand, thus showing an environment favourable to the growth of the genus.

The distribution of the species is remarkable: 14 species are confined to the North Island; 55 are found only in the South Island. Only 11 species are found in both islands.

Three species are found only in the Chatham Islands, and one in the Auckland and Campbell Islands alone.

Of the 84 species, 49 live more than 1,000 ft. above sea level. Only 12 are purely lowland plants, while 13 are as much at home on the hills as on the plain. Most of the lowlanders are able to live either near the sea or distant from it, but 10 are never seen far from the sea. It can thus be seen why so comparatively few of the species are known in England.

The two species discussed in the latter part of this paper are unable to survive the sea breezes for more than a single season.

One of the most fascinating studies in connexion with the Veronicas is that of the causes of the mutation of species. Probably no other plants show such a variation of shape and structure in a single species.

A wild specimen may entirely change its character in the course of a few months when placed in the garden, while the seedlings around the parent plant may show a wide mutation range. Environment seems to be responsible for the former change and hybridization for the latter, if other species are in the vicinity. But the same seedling variation is seen when hybridization is impossible, though the seedlings later revert to type. The problem is too wide for discussion in this paper.

Most of our Veronicas are handsome ornamental shrubs, graceful in shape, foliage, and bloom, but of little value to produce flowers for cutting. In fact the two species described later may be considered the only ones of value to the florist. The " whip-cord " species are more curious than beautiful. Apart from their ornamental value, however, several of them are of great value as pioneer wind-screens for plantations on wind-swept sea coasts.

*V. elliptica* and *V. Diefenbachii* as an outside belt might grow about three feet in as many years. The next belt inside would attain five feet in the same time, while the third belt would probably reach ten feet and enable *Pinus maritima* to get a good start and produce a useful plantation, to be backed by more tender trees if desired.

## TWO SPECIES OF OUTSTANDING MERIT.

### *Veronica Hulkeana* (fig. 72).

This species has been introduced into Europe, but no seedsmen's catalogues which mention it have been seen by the writer. It is a laxly branched shrub of from one to two feet in height. The branches are spreading and sparingly leafy. The leaves are from  $1\frac{1}{2}$  to 2 inches long, oval and coarsely serrate, dark green and glossy, being sometimes margined with crimson. The panicles are loose and often a foot in length by six inches broad at the base. The flowers are lilac, and on this account the plant is sometimes called " New Zealand lilac."

It is an extremely local plant, being found only in the north-eastern corner of the South Island, and then only south of the Wairau River. It is difficult of access, growing on the perpendicular faces of deep gullies. It is a very accommodating plant except that it objects to sea breezes. Any wind discolours the delicate flowers and robs the plant of its full beauty. As a conservatory plant it has few equals. To grow this species



FIG. 72.—*VERONICA HULKEANA*.

[To face p. 312.]

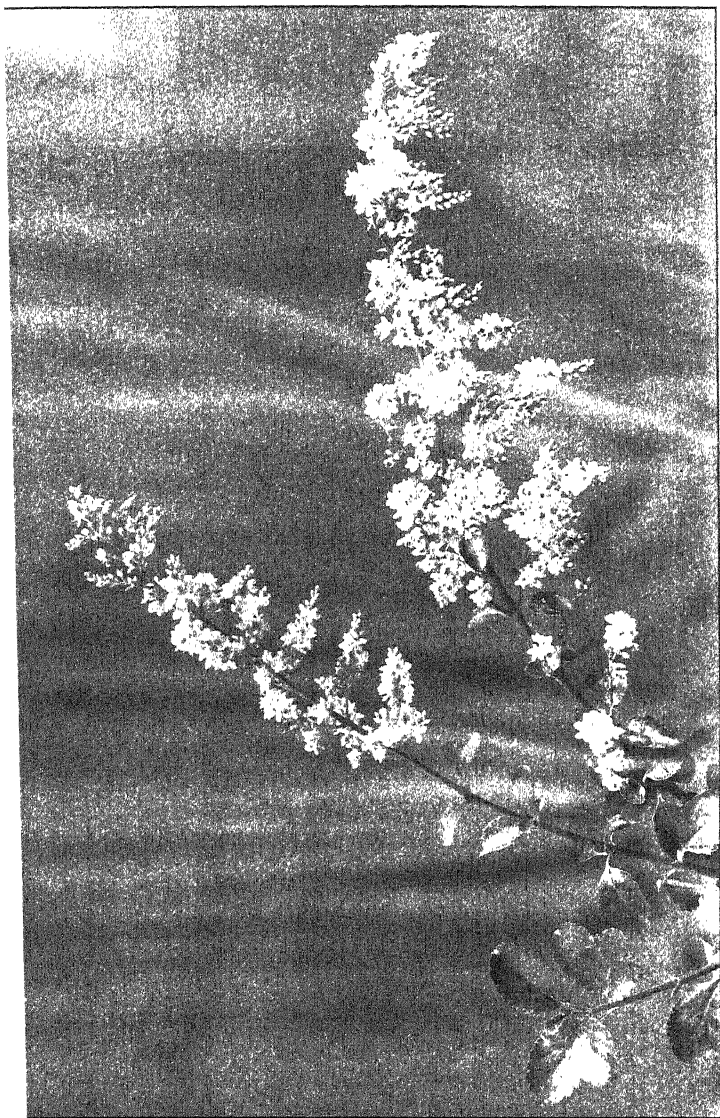


FIG. 73.—*VERONICA LAWTONII*.

[To face p. 313.



to perfection it is advisable to give it an easterly or westerly position in moist, rich soil, where it is protected from winds.

It blooms in the Dominion early in November, corresponding with May in the south of England. After flowering it throws up suckers which produce the next season's flowers. As soon as the suckers appear the old wood is removed, but if left will bear flowers from year to year, though the graceful outline of the plant is lost.

Fig. 72 shows a spray of flowers  $\frac{1}{4}$  natural size.

*Veronica Lawtonii* (sp. nov.).

This bears a general resemblance to *V. Hulkeana*, but the branches are erect, and the whole plant more rigid in character. The surface of the leaves is dull, showing none of the glossy surface of *V. Hulkeana* and never having the crimson margin. The colour also is different, being of a more emerald tint.

The panicles are white with a delicate suggestion of green when grown in the open. Reference to the figure will show that the panicles are more compact than in *V. Hulkeana*. The plant is also some six weeks later in blossoming, the two species being never found in flower together. It is not so accommodating as *V. Hulkeana*, and must have a rich moist position where the direct rays of the sun do not fall on it for more than an hour or two a day. It objects to winds, and especially to sea breezes.

It may be an assistance to the grower to know that the plant is at home where Cinerarias grow to perfection. So much is this the case that the author's best specimens are in the centre of a bed of Cinerarias. The spray shown in fig. 73 is taken from such a plant ( $\frac{1}{4}$  natural size). It is extremely floriferous and throws sprays of over a foot in length when it is in a congenial position.

An effort was made to introduce the plant to England last year, but all the specimens died in the tropics. Arrangements have been made to send seed this year to enable growers to see more of these two species.

## INSECTS CAUGHT IN LIGHT TRAPS.

By FRED. V. THEOBALD, M.A., F.E.S., Hon.F.R.H.S.

Most insects are affected by "light"; this is spoken of as phototropism. The sense reaction when the insects are attracted to light is called "positive phototropism." The economic possibilities of positive phototropism have not yet been sufficiently investigated.

If the windows of a brightly lighted room are left open at night, in summer or autumn, many moths and other insects are enticed into the room, often in annoying numbers, even when the light is not very powerful, and in winter the December Moths are also attracted. A favourite hunting-ground for moths in my young days was the street lamps in and around Hastings, and many a good bag have I had from an early morning walk with the lamp attendant when putting the lights out; on one occasion in less than a mile I collected twenty Poplar Hawk Moths. The lamp-lighters used to collect for me, and many good specimens were thus obtained, including an Oleander Hawk and a Silver-striped Hawk, which were found now and then in that district. The moths were attracted, especially on dark, damp, warm nights, by the gas, and some got into the lamp glasses and others were found at rest on the outsides in the morning. Numbers of Winter Moth males have been frequently noticed flying about in such positions. Only a few years ago I observed twenty male Winter Moths around one street lamp in Wye. This positive phototropism has been made use of by entomologists for catching moths for their collections by means of special apparatus. It has also been employed for the benefit of cultivation to trap the destructive species; but light attraction has not been sufficiently investigated to prove its economic value.

The experiments of which the results are recorded here were undertaken to throw further light on this subject, and definite useful results certainly seem to have been obtained. The object was, firstly, to see if a sufficient quantity of male Winter Moths could be caught, so as to stop fertilization of the females; and, secondly, to see if Tortrix Moths would come to the light in sufficient numbers to help control this pest, which at present cannot be satisfactorily dealt with by spraying, although carbolineum winter washes do some good.

The simplest light trap I have seen was one employed by a fruit-grower on the banks of the Thames, in Kent—a hurricane lamp, standing in a tray of paraffin-oil and water. The grower sent me a box full of the insects caught in this inexpensive trap; they were badly damaged, but amongst them I counted 470 individuals of injurious Tortrices. This seemed so promising that I decided to test

the "Medusa" acetylene light traps used in Continental vineyards for the suppression of the Vine Tortrices.\*

Various lights seem to have different degrees of attraction. PERRAUD in 1904 found that the white light ratio was 33·3; yellow, 21; green, 13; red, 11; blue, 3·9; violet, 2·2 per cent. NEUSTADT (*Journ. Trop. Agri.*, 1913), using incandescent lamps containing mercury vapour, rich in violet and ultra-violet rays, caught 54,500 moths on ten successive nights. The only light used in the experiments recorded here has been the acetylene flame of the "Medusa" lamp. Its brilliant glare at night can be seen by the photograph reproduced here, which, however, does not show the rays of darting light given out by the flame. The naked acetylene light of this lamp stands a great deal of wind, in fact on only six nights during the two years was it blown out owing to the strength of the wind. On such nights it is almost certain that no moths would be on the wing. On some excessively cold nights the water in the traps froze. Beyond this no untoward incidents occurred.

CRIDDLE (*Canadian Entomologist*, 1918) and some others have pointed out many disadvantages of "light traps." The three chief seem to be: (1) The number of species and individuals caught is comparatively small; (2) the numerical preponderance of males over females; and (3) the number of hymenopterous parasites caught in them.

With regard to the numbers of species and individuals caught, these experiments show that in certain groups, such as Tortricidae and Tipulidae, the number caught is entirely satisfactory. With regard to the preponderance of males over females, it seems this chiefly applies to the Bombycidae, Geometridae, and Taeniocampae, for very large numbers of female Tortricidae, Crambidae, and Tipulidae were attracted to the light and caught. During one night female Tortrices actually predominated over the males, and on several occasions this happened with the Crambids. Even if males are caught in numbers this must much reduce the amount of pregnant females, and it was to find this out in connexion with the Winter Moth that these observations were first started. With regard to the hymenopterous parasites caught, the number recorded here shows them to be very few and confined to one species of *Paniscus*. Of the other beneficial insects a few Lace-wing Flies (Chrysopidae) were alone trapped, with the exception of one or two Ladybirds.

#### *Weather Conditions.*

The number of insects caught is, of course, influenced by the weather conditions. The best occasions have proved to be cloudless nights, absence of moonlight and of fog, and the presence of a fine warm rain. Few moths were caught when heavy rain or very windy periods occurred. Warm nights are certainly most favourable in

\* A cheaper acetylene lamp trap is now on the market—the "Lucina" lamp.

summer. An excessively cold spell of weather undoubtedly tends to induce the majority of moths to remain under shelter, but even then it is advisable to keep the lamp alight, as it is impossible to tell whether the varying temperature will keep its low standard or will rise enough to cause the moths to venture out. During the autumn and winter male Winter Moths were taken when the thermometer was below 32° F., in one case when it sank to 28°. Contrary to certain statements, it was found that flight was not restricted by electric disturbances, and just previous to thunder many more insects than usual were often found in the traps. When very hard frosts occur it is impossible to use the lamps, as the water used to generate the gas freezes. Sacking bound round the base of the lamp was found to prevent this in some cases, but when such heavy frosts occur very few moths are on the wing, making it unnecessary to use the lamps at that time. Slight frosts do not seem to have any effect on the flight of some moths.

#### *The Necessity for Removing the Trays during the Day.*

It was found that if the trays are left with the oil and water in them during the day a good deal of harm may be done, as many hive bees get into the oil. Even the Large Heath Butterflies and Cinnabar Moths were found in them if left uncovered during the daytime. It is advisable to remove or cover the trays as soon after sunrise as possible, for when left only till eight o'clock many bees were found to be killed.

#### *Position of the Lamps.*

The lamps were placed in a mixed fruit plantation, consisting mainly of apples, currants, and nuts, with a few plums, but near a pear plantation and close to some loganberries, American blackberries, and strawberries. The height of the lamps from the soil does not seem to matter much. They are usually placed on a pole or on a box, and so raised up a few feet, but I found no more insects were caught than when the lamps were placed on the ground, as shown in the photograph. They should be lit just as it is getting dusk, and it was found that if fully charged they will burn for a good eight hours.

*The length of flight time* of some insects recorded here is shown to be much longer than is generally supposed. For instance, the first *Tortrix podana* in 1924 was taken on June 25 and the last on August 31. The first Magpie Moth (*Abraxas grossulariata*) was taken on July 24 and the last on September 2 in the same year, whilst *Tortrix rosana* was caught from June to September, but normally only a few occur at first and a few stragglers at the end, the maximum flight period lasting from seven to fourteen days. Most moths are caught between sunset and one o'clock. It was observed during the winter of 1923 that the moths then occurring were usually on the wing during the early part of the evening, most being caught up to two hours from the time of lighting.

*Cost of Running the Lamps.*

This is not excessive. A lamp uses only 4-5 oz. of carbide a night. Carbide is 6d. a lb., so an average for the year (allowing for nights the lamp was not used) is about £2, using the ordinary fine carbide; for a quality of carbide somewhat coarser the cost would be less, as the amount used would not be so great. As will be seen from the tables appended, their chief value for moth destruction is during the months of June, July, and August, and they are only recommended for that period, consequently the cost is not more than 10s. a lamp per annum. The cost of the oil is very small.

Enough work has not been done to show how many lamps are required to get the best results, but from general observation it seems that one per acre is sufficient. Moths are evidently drawn to them from a good distance, for the Loganberry Shoot Moth (*Aspis udmanniana*) caught was in a lamp a good 400 yards from the nearest natural food plant, and the lamps were in a fairly thick plantation at the time. It has been found that the use of paraffin-oil upon the water in the tray of the lamp is a necessity, for when water alone was used it was observed that some moths were able to escape from the tray. The presence of oil made it impossible to name some of the insects caught.

The traps undoubtedly failed as a means of catching male Winter Moths, for in no case were they taken in any large numbers. The tables, however, show that large numbers of Tortrices are eliminated, and as these are not completely dealt with by spraying the use of these light traps may probably prove of great benefit in districts where these pests are serious, and they are certainly worth an extended trial by growers who suffer from Tortrix damage. They at the same time attract moths from the hedgerows, from which source Tortrix infection may very often come.

In these experiments at Wye one lamp was used during the whole of the two years, and the second lamp in addition from July 14, 1924, onwards, it having been tried prior to that date at Ash, near Canterbury.

*Number of Insects Caught.*

From October 1, 1923, to September 30, 1924, the number of moths taken in the lamps was 3,922; Diptera, 3,568; Ichneumon Flies, 16 (all *Paniscus*); Lace-wing Flies (*Chrysopa*), 7; and 12 other insects and some Spiders, making 7,525 in all.

From October 1, 1924, to September 30, 1925, the moths numbered only 1,983; the Diptera 364 (this year *Trichocera*, Muscids, etc., were not counted); 80 *Paniscus*; and 25 other insects, making a total of 2,452. The total for the two years was 9,977; of these 3,220 were definitely identified as insect pests; of the latter 1,625 were injurious Tortricidae, 368 of the Winter Moth group and 594 injurious Tipulids. Eight hundred other Tortricidae were caught, but so damaged that they could not be identified with precision, these with the identified

species making 2,425. It will be seen from the tables that the only large catches of insects were from October to January, and again from June to August, practically all during the former period being males.

### *Percentage of Males and Females.*

As mentioned above, practically all moths caught from October to March were males, the exception being the Figure of 8 Moth (*Diloba coeruleocephala*), of which 10 per cent. were pregnant females. Of the Bombyces caught during the summer 97 per cent. were males; of the Agrotids the females were 45 per cent. in one year, 7 per cent. in the other; but with the Tortrices the females were 50 per cent. (in one week 60 per cent.), and the Crambids 45 per cent. The recorded injurious Tineids were not critically examined. With the Tipulidae the sexes were about equal during one week, but for the whole period only 27 per cent. were females.

On several nights the oil on the trays was covered with the ova of Tortrices, Crambids, and Tipulids, evidently laid *in extremis*, and the pregnant bodies of the female Tortrices were very marked.

The plantation in which these traps were set was not badly attacked by any pests except Sawfly, so that no large catches were expected.

On the other hand, one lamp was sent to Ash, where Winter Moth had been very abundant, and Mr. F. FOAR, on whose land it was used, found the result disappointing, very few males being caught. The insects caught at Ash were not counted.

### *List of Species of Economic Importance Caught.*

Gold Tail Moth (*Porthesia similis*).  
 Lackey Moth (*Malacosoma neustria*).  
 December Moth (*Pocilocampa populi*).  
 Figure of 8 Moth (*Diloba coeruleocephala*).  
 Heart and Dart Moth (*Agrotis exclamationis*).  
 Turnip Moth (*Agrotis segetum*).  
 Rustic Shoulder Stripe Moth (*Hadena basilinea*).  
 Cabbage Moth (*Mamestra brassicae*).  
 Clouded Drab Moth (*Taeniocampa incerta*).  
 Rosy Rustic Moth (*Hydroecia nicaea*).  
 Antler Moth (*Charaxes graminis*).  
 Dagger Moth (*Acronycta psi*).  
 The Angle Shades Moth (*Phlogophora meticulosa*).  
 Silver Y Moth (*Plusia gamma*).  
 Short Cloak Moth (*Nola cicutatella*).  
 Green Pug Moth (*Eupithecia rectangularis*).  
 Winter Moth (*Cheimatobia brumata*).  
 March Moth (*Anisopteryx aescularia*).  
 Early Moth (*Hybernia ruficaparia*).  
 November Moth (*Oporabia dilutata*).  
 Brindle Beauty Moth (*Biston hirtaria*).  
 Pale Brindle Beauty Moth (*Phigalia pilosaria*).  
 Magpie Moth (*Abraxas grossulariata*).  
 Mottled Umber Moth (*Hybernia defoliaria*).  
 Thorn Moth (*Himera pennaria*).  
 Spinach Moth (*Cidaria dotata*).  
 Garden Pebble Moth (*Pionea forficaris*).  
 Rose and Maple Tortrix (*Tortrix forskaleana*).

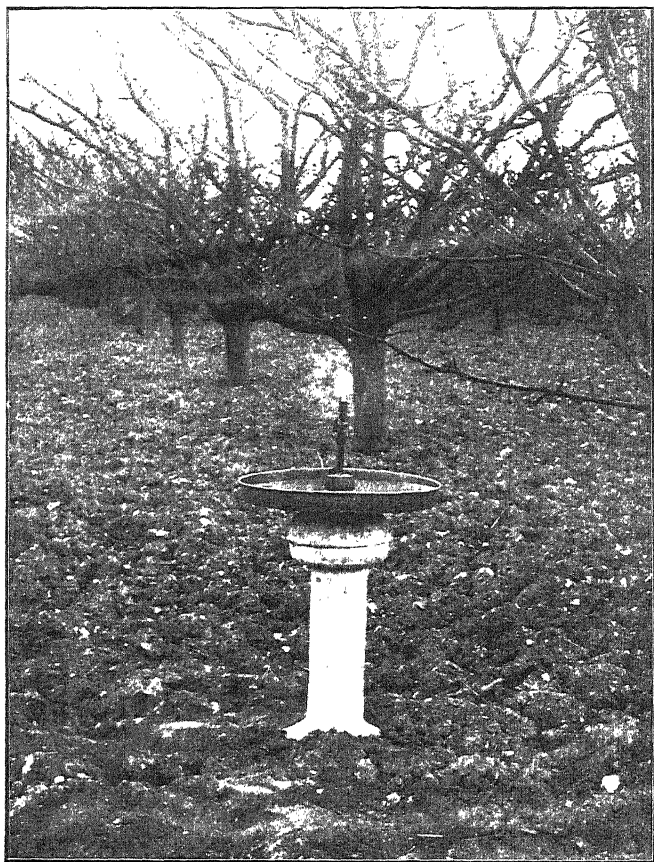
Nut Tortrix ( <i>Cacoecia corylana</i> )	}	Fruit and Rose Tortrices.
<i>Pandemis heparana</i>		
<i>Pandemis ribeana</i>		
<i>Cacoecia rosana</i>		
<i>Cacoecia podana</i>		
<i>Argyroplote pruniana</i>		
<i>Argyroplote variegata</i>		
<i>Notocelia roborana</i>	}	
<i>Pamena rhediella</i>		
Spruce and Larch Tortrix ( <i>Epinotia dimiana</i> ).		
Pine Tortrix ( <i>Evetria pinivoreana</i> ).		
Bud Moth ( <i>Tmetocera ccellana</i> ).		
Codling Moth ( <i>Cydia pomonella</i> ).		
Rose Tortrix ( <i>Notocelia rosaeolana</i> ).		
Loganberry Shoot Moth ( <i>Aspis udmanniana</i> ).		
<i>Acalla comariana</i> .		
<i>Acalla holmiana</i> .		
<i>Acalla contaminana</i> .		
Rose Tortrix ( <i>Epiblema tripunctata</i> ).		
<i>Tortrix bergmanniana</i> .		
<i>Euxanthia angustata</i> .		
Pine Cone Tortrix ( <i>Laspeyresia strobiliella</i> ).		
Pea Moth ( <i>Laspeyresia nigricana</i> ).		
<i>Sidera achatana</i> .		
<i>Simæthis pariana</i> .		
Lettuce Tortrix ( <i>Semasia contaminana</i> ).		
Diamond Back Moth ( <i>Plutella maculipennis</i> ).		
Pith Moth ( <i>Blastodacna vinolentella</i> ).		
Plum and Cherry Fruit Moths ( <i>Argyresthia pruniella</i> and <i>A. nitidella</i> ).		
Little Ermine Moth ( <i>Hyponomeuta padella</i> ).		
Fruit-tree Case Bearer ( <i>Coleophora nigricella</i> ).		
Common Crane Fly ( <i>Tipula oleracea</i> ).		
Yellow Spotted Crane Fly ( <i>Pachyrhina maculosa</i> ).		
Carrot Fly ( <i>Psila rosae</i> ).		
Spotted Anopheles ( <i>Anopheles maculipennis</i> ).		
Clear Wing Anopheles ( <i>Anopheles bifurcatus</i> ).		
Brown Gnat ( <i>Culex pipiens</i> ).		
Cockchafer ( <i>Melolontha vulgaris</i> ).		
Earwigs ( <i>Forficula auricularia</i> ).		
Ichneumon Fly ( <i>Paniscus</i> sp.).		
Lace-wing Flies ( <i>Chrysopa</i> spp.).		
Ladybird Beetle ( <i>Adalia bipunctata</i> ).		

#### Chief Insects of Non-Economic Importance Caught.

Winter Gnats (*Trichocera* spp.) occurred in great numbers every night from late October to December during both years, but were not counted the second year. Of the Knot Grass Moths (*Crambus*), at least five species were caught, often in great numbers; one night 384 were counted in the two traps. Thorn Moths (*Selenia illunaria*, *S. bilunaria* and *Crocallis elinguaris*) occurred in numbers, especially the last named. The Brimstone Moth (*Opisthograptis luteolata*) was often caught, a dozen or so a night. The Hebrew Character (*Taenio-campa gothica*) was also taken in abundance, and also *T. miniosa*, *Orthosia lota*, and *O. pistacina*, with a few Flounced Chestnuts (*Anchocelis rufina*) and Lunar Underwings (*A. lunosa*). The White and Buff Ermines (*Arctia menthrastis* and *A. lubricipeda*) were caught every night during their flight-period, which in 1924 extended from May 21 to July 1. The Dark Arches (*Xylophasia polyodon*) was present every night from June 25 to August 1. The Bloodvein (*Timandra amatoria*), the Purple Bar (*Melanthia ocellata*), the Sharp-



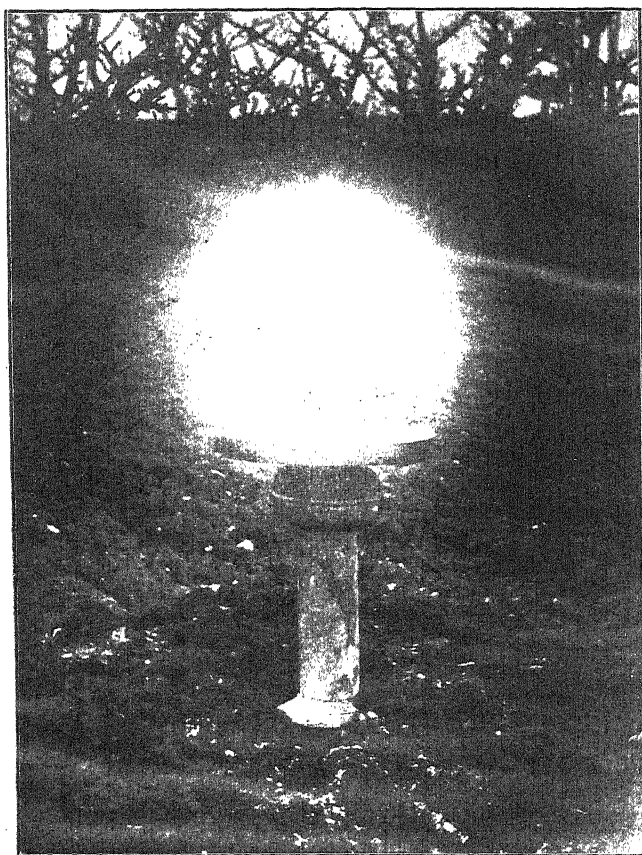




[Photo by Edenden, Wye.

FIG. 74.—THE "MEDUSA" LAMP.

[To face p. 320.



*[Photo by Edenden, Wye.*

FIG. 75 —THE "MEDUSA" LAMP AT NIGHT.

gle Shades Moth ( <i>Phlogophora reticulosa</i> )	I	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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angled Carpet (*Melanippe unangulata*), the Silver Ground Carpet (*M. montanata*), the Red Twin Spot (*Coremia ferrugata*), the Dark-barred Twin Spot (*C. unidentata*), the Wood Carpet (*Melanippe rivata*), the Small Grass Emerald (*Nemoria viridata*), the Riband Wave (*Acidalia aversata*), the Little Emerald (*Iodis lactearia*), and *Pelurga limitata*, were all abundant. The Streak (*Chesias spartiana*), Mallow Moth (*Eubolia cervinaria*), the Golden Y (*Plusia iota*), the Burnished Brass (*P. chrysis*), and the Spectacle Moth (*Abrostola triplana*), occurred several at a time. The Oak Hook Tip (*Drepanula hamula*), and about twenty Common Footman (*Lithosia complanula*) were caught, as well as the Chinese Character (*Cilex spinula*), often in great numbers, and a fair number of the Marbled Beauty (*Bryophila perla*), especially in 1925, and several Ziczag Moths (*Notodontia ziczag*). The Minors were represented by many *Miana strigalis*, Wainscots (*Leucanium*) by great numbers of *L. pallens*, of which forty were taken one night, and some *L. conigera* and *L. comma*. Considerable numbers of Noctuids were caught, including many Small Clouded Brindles (*Apamea unanimitis*), Common Rustic (*A. oculea*), Treble Line (*Grammesia trilinea*), Mottled Rustic (*Caradrina morpheus*), Shuttle-shaped Dart (*Agrotis puta*), Square Spot Dart (*A. obelisca*), Flame Shoulder (*Noctua plectra*), Double-spotted Square Spot (*N. triangulum*), the Purple Clay (*N. brunnea*), Square Spot Rustic (*N. xanthographa*), Dog Tooth (*Hadena suasa*), and many others taken as single specimens. Several species of Scoparia occurred from May to September, and Phychidae, including *Homoeosoma nimbella* in some numbers in May and August, *Rhodophaca advenella*, small Magpie (*Eurrhyncha urticata*) and the Bumble Bee Moth (*Aphomia sociella*).

No fewer than seventeen species of Tortrices were identified, the commonest non-economic species being *Xanthosetia hamana* (which occurred from late July to September); very many were so damaged by the oil that they could not be identified. A few Plume Moths also occurred in the trays, including the White Plume (*Alucita pentadactyla*), which occurred forty times, and a few Brown Plumes. Very many Diptera occurred, mainly Muscids. Beetles were very uncommon, a few *Aphodius* and Cockchafers being the only ones found. Alder Flies and Caddis Flies were plentiful at times, and a few Spiders and Phalangids crawled into the trays.

Beneficial insects caught were very few, about 100 *Paniscus* sp., 17 Lace-wing Flies (*Chrysopidae*), 6 Ladybird Beetles (*Adalia bipunctata*), being the only ones. No other parasitic hymenoptera could be found, and the contents of the trays were most carefully examined. Altogether 190 species were taken in the lamp trays.

### Conclusion.

Judging from the results of two years' work it appears that much good is done by light traps in destroying Tortrices, and for this purpose

they may safely be recommended for use in plantations which are infested with these insects. At the same time other pests are killed, but not enough, in the writer's opinion, to warrant their use for any of them, as the necessity for spraying still remains. If a field of Loganberries or American Blackberries is affected with the Shoot Moth they might well be used there, as spraying does not control this insect, and the moths, like other Tortrices, are much attracted by light.

Mr. MARTIN AUSTIN has attended to the traps during the whole period, and has added a number of valuable notes.

*Table of Catches of Moths per Month for Two Years.\**

	October.	November.	December.	January.	February.	March.	April.	May.	June.	July.	August.	September.
1923-24 .	122	14	90	68	9	7	24	4	489	678	181	32
1924-25 .	33	21	85	43	13	8	16	71	153	494	463	102
Total .	155	35	175	111	22	15	40	75	642	1172	644	134

\* The Crambids were not counted, and are not included in the above figures.

## A PECULIAR SCORCH AND DYING OF FRUIT TREES IN THE WISBECH DISTRICT DURING 1923.

By F. R. PETHERBRIDGE, M.A.; W. A. R. DILLON WESTON, B.A.;  
and L. F. NEWMAN, M.A.

DURING September 1923 Mr. W. G. KENT, the Horticultural Superintendent for the Isle of Ely, reported that several hundred plum and apple trees in the Wisbech district were dying through some unknown cause. Since this had occasioned alarm he asked for an investigation. The following is a *résumé* of some of the work carried out.

### SYMPTOMS OF THE DISEASE AS OBSERVED IN THE FIELD.

The external characteristic of the disease was a peculiar scorched appearance of the foliage; the leaves, brownish black with a slight bluish tint, curled slightly, became brittle, and fell early. Whereas some trees were badly scorched, others showed only slight symptoms. Although affected trees were easily recognized by these symptoms alone, the most noteworthy characteristic (not previously seen by us in fruit trees) was a blue-black stain, varying somewhat in intensity of colour, present in the wood of both roots and stems. In the latter it was of a dirty light blue colour, but in the former darker, and often completely black. Sometimes when the main roots themselves were very badly discoloured secondary roots and suckers were unstained, and many dying trees were throwing up suckers in which no staining occurred. In an extensive tour of the district no affected trees were observed in grass orchards. In cultivated orchards the dying trees were sometimes isolated, but more often grouped together, but in one case a healthy 'Grenadier' apple tree was found surrounded by dying trees, but this tree was younger than its neighbours.

At the date of the investigation, affected trees had been observed in fourteen gardens situated between Leverington Common and Upwell, and about a thousand trees showed the above symptoms, a large number being dead. No variety of apple or plum appeared resistant to attack, but bush fruit in affected orchards showed no unhealthy symptoms. Where affected apple trees bore fruit these were said to be about the size of walnuts.

The trees in which these abnormalities occurred were between fifteen and twenty-five years old.

In one orchard a detailed record of affected trees was made, and the survey showed 157 trees to be injured or dead, which was about 50 per cent. of the total trees. These were then labelled according to the severity of attack.

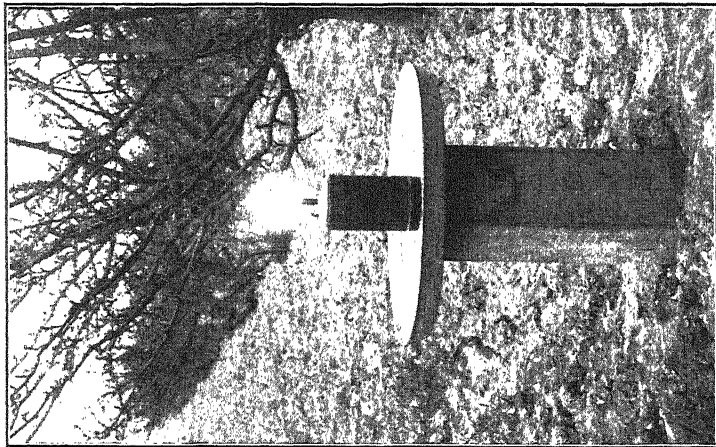


FIG. 76.—THE "LUCINA" LAMP.

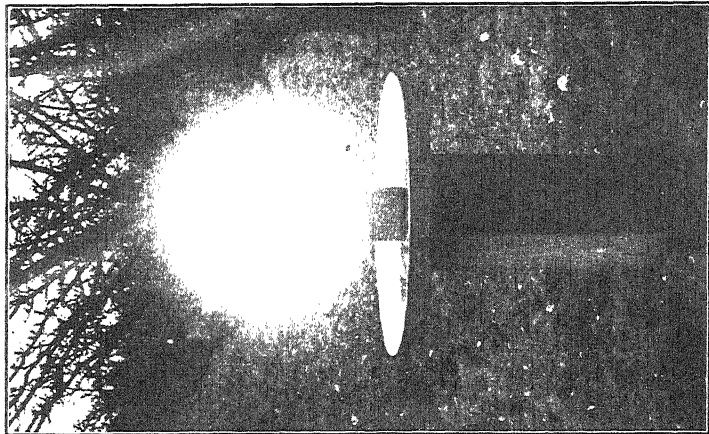


FIG. 77.—THE "LUCINA" LAMP AT NIGHT.  
[To face p. 324.]

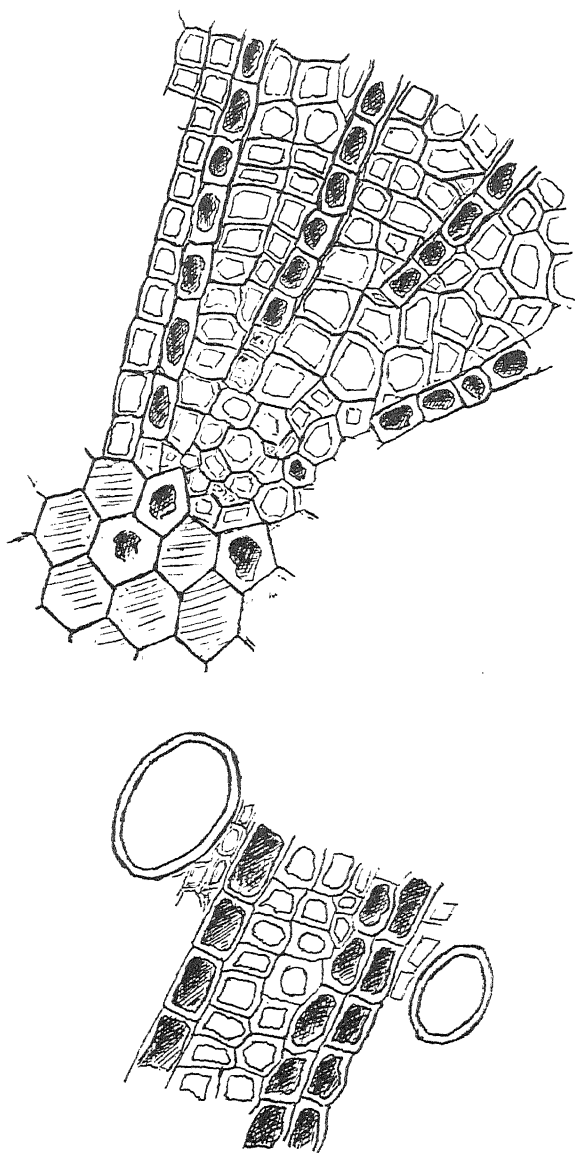


FIG. 78.—*Top* : TRANSVERSE SECTION OF STEM OF CHERRY LAUREL USED IN EXPERIMENT I. *Bottom* : TRANSVERSE SECTION OF ROOT OF DISEASED APPLE SHOWING PART OF XYLEM.



TABLE I.

*Intensity.*

Variety.	Slight.	Moderate.	Bad.	Very Bad.	Dead.
Bramley's Seedling . .	14	8	21	16	—
Newton Wonder . .	4	4	5	8	2
Lane's Prince Albert . .	1	1	2	1	1
Grenadier . . . .	11	4	2	6	5
Lord Grosvenor . . . .	—	—	—	1	2
Emneth Early . . . .	13	14	7	4	—
Total . . . . .	43	31	37	36	10

The grower's observation on this orchard was that "the trees on the poorer soil are affected most" (i.e. there were more trees affected on that portion of the orchard which normally made poorer growth).

In this and a number of other orchards that were examined several of the commoner fruit parasites were found, the most abundant being the Silver Leaf fungus (*Stereum purpureum*), fungi causing "die-back" (*Diaporthe perniciosa* and *Cytospora* sp.), and the "canker" fungus (*Nectria galligena*). There was, however, no one fungus constantly occurring on the affected trees.

#### THE ROOT SYSTEM OF DYING TREES.

On an orchard belonging to Messrs. CROFT of Wisbech a pit was sunk approximately 7 feet long by 3 feet wide by 6 feet deep at the side of an affected 'Grenadier' apple tree.

Observation of the face gave a good vertical section of the roots, showing that in the first 3 feet some were dead, some stained, and some healthy. Below 3 feet all were stained and dead. Dead roots, both small and large, showed the typical dark blue-black (or completely black) coloration of the wood. Some of the smallest roots, about 0.2 mm. in diameter, were found blackened at their tips, and on tracing these backwards the staining was found in the older portions of these younger roots.

From this pit roots were taken back to the laboratory for (a) chemical, (b) bacteriological, (c) botanical examinations. Samples of soil were also taken for mechanical and chemical analyses.

#### OBSERVATIONS IN THE LABORATORY.

##### (a) *Chemical Analysis of Wood.*

Analyses of the fresh ash of diseased and healthy twigs and shoots were made. The results given in Table II. show that there was a big difference in the percentage of ash in the two cases.

Since the ash of diseased plants was considerably darker, tests for iron were made, and subsequently determined quantitatively.

TABLE II.

Area.	Roots.			Twigs.		
	Ash per Cent. Fresh Weight.	Per Cent. Iron in Ash.	Per Cent. Iron in Plant.	Ash per Cent. Fresh Weight.	Per Cent. Iron in Ash.	Per Cent. Iron in Plant.
Healthy . . .	3.30	2.83	0.093	4.55	0.339	0.0154
Diseased . . .	11.71	2.948	0.345	6.18	0.513	0.0317

These analyses of diseased and healthy apple-wood show that roots from dying trees contained three and a half times as much iron as those from healthy trees; also that shoots from dying trees contained twice as much iron as those from healthy trees. But it should be noted that the percentage of iron in the ash has only gone up very slightly in the roots and has only increased 50 per cent. in the twigs. It is evident, therefore, that the outstanding change has been the very large increase in total ash.

One hundred grammes of infected roots were soaked in 200 c.c. of a 0.012 per cent. iron solution (ferrous sulphate), and after soaking for five days the amount of iron in the solution was increased to 0.017 per cent. Non-infected roots were treated in the same way, and, after soaking and removal of the roots, the iron in the solution was reduced to 0.0047 per cent. Thus the diseased roots have given up iron to the solution whilst the healthy roots removed more than half the iron from the solution. The healthy roots that had been soaked showed some coloration.

(b) *Chemical Analysis of the Soil.*

These samples for analysis were taken during October 1923, and the soils at varying levels from 9 inches to 5 feet 6 inches were analysed both chemically and mechanically in two of the affected orchards, one at Emneth, the other in a plantation near the North Brink. The percentages of calcium, magnesium, and iron at a depth of 2 feet 6 inches to 3 feet 6 inches are given in Table III.

TABLE III.

Location.	Substance.	Soil from Infected Area.	Soil from Non-infected Area.
Emneth . . .	Iron as $\text{Fe}_2\text{O}_3$ . . .	Per Cent. 3.53	Per Cent. 4.16
North Brink . . .	„	3.88	4.35
Emneth . . .	Calcium as $\text{CaO}$ . . .	1.95	3.57
North Brink . . .	„	2.1	5.62
Emneth . . .	Magnesium as $\text{MgO}$ . . .	1.81	0.61
North Brink . . .	„	1.5	0.43

Since it was at this depth that the majority of roots were dead, these figures are interesting, for, although the iron fluctuates very little, the differences between calcium and magnesium are very marked, and one might suspect that the calcium:magnesium ratio had been upset. Mechanical analyses of these soils were also taken, but no marked differences could be seen.

(c) *Bacteriological Examination.*

Cultures were made from infected material, and of seventy-one colonies seventy were identical. A number of young apple trees were inoculated with the organisms from these cultures in the late spring of 1924. These trees were examined periodically, but at the present date (December 1925) no abnormal symptoms, as described above, are manifest; but in some cases *Diaporthe perniciosa* and *Cytospora* sp. are present.

(d) *Botanical Examination.*

Cultures were made from "diseased" material, the media employed being apple agar and sterilized wood of plum and apple.

Inoculations from the wood of diseased stems showing no obvious parasite (or saprophyte) gave negative results. Inoculations from much blackened roots gave chiefly mucor, penicillium, and bacteria.

#### LOCATION OF STAIN IN WOOD.

In sections from stems which showed no obvious parasite, staining with lacto-phenol and cotton blue failed to reveal fungal hyphæ. In stained sections of roots hyphæ were sometimes found.

Sections from stem and root showed that it was the living portion of the wood that was stained, the blue-black colour being found in the medullary ray cells and wood parenchyma. It would seem, therefore, that the coloration occurs only in those cells that are concerned with the adsorption of solutes from the ascending sap (fig. 78).

In all sections examined "gumming" had taken place.

#### EXPERIMENTAL.

To see if this disease was contagious—as it was thought to be by many growers—portions of "diseased" roots and stems were taken from a Wisbech orchard and grafted into healthy roots and stems of apple trees in our experimental plot at Cambridge. The grafts were made during October 1923; at the date of writing (October 1925) these trees show no abnormal symptoms.

Inoculations, other than those given, from a culture of bacteria (taken from stained tissues) into healthy apple stems gave negative results.

Roots of a healthy tree were uncovered on one side and chips from a "diseased" root were then used to cover it. The soil was replaced. The tree after two years is healthy and there are no discolorations in root or stem.

## REPRODUCTION OF THE STAIN ARTIFICIALLY.

An attempt was made to reproduce this characteristic stain (*Experiment 1*). As fruit trees were then dormant, a Cherry Laurel was selected. The roots were washed until the soil had been removed, then they were carefully re-washed in distilled water, and two of the roots were led away into two glass cylinders containing Sach's nutrient solution (0.3 per cent.) to which an excess of iron, as ferrous sulphate, had been added. Since in this experiment it was our object to imitate the symptoms of the disease and its peculiar coloration, an excess of iron was added deliberately.

The plant, together with the two cylinders, was then potted up, and the cylinders so arranged that their contents were not contaminated by the soil.

In three days the leaves looked unhealthy, and by the tenth day had much the same appearance as had the apple leaves of "diseased" trees.

Further experiments were carried out with twenty-four Privet bushes. The more interesting of these are quoted.

*Experiment 11.*—The roots of the Privet were cleaned and at 4 P.M. placed in a Sach's solution, to which 2 grammes of ferrous sulphate per 2,000 c.c. of solution had been added. The next day, at noon, some root tips showed a bluish tinge, and at 3.45 P.M. the same day the root tips were distinctly blue, and somewhat similar to the blackened root tips that had been found in the pit dug at Messrs. CROFT'S.

*Experiment 12.*—The roots of a Privet were cleaned and two of them then killed by placing in boiling water for one minute. At 12.45 P.M. the plant was placed in a jar containing a Sach's solution to which was added 1 gramme of ferrous sulphate per 2,000 c.c. of the solution. When next visited at 3.45 P.M. the same day, the roots that had been killed were found to be blue-black, but the untreated roots appeared normal with no obvious discoloration. This last experiment was repeated, and it was then found that the roots which had been steamed were completely blue-black after remaining in the solution for nine minutes. In three minutes there was a faint trace of blue. The colour produced in these roots after eight to nine minutes was in every way comparable to the coloration that was observed in the roots and stems of "diseased" trees at Wisbech.

A further experiment is quoted. A root was killed by steam and placed in a Sach's solution which contained 0.05 per cent.  $\text{FeSO}_4 \cdot 5\text{H}_2\text{O}$ . This was badly discoloured and turned blue. Another root was killed and placed in a solution of 0.05 per cent. ferrous sulphate alone. In the same given time this did not appear to show so much discoloration.

In addition to these experiments, Privets were also watered with various iron solutions, but discoloration of the roots only took place when these had been killed; when, however, plants were allowed to

absorb iron solutions by the stem, the discoloration of the leaves and living elements of the tissues were again similar to affected trees at Wisbech. It thus appeared that solutions containing 0.1 per cent. ferrous sulphate could bring about slight discoloration in living undamaged roots of Privet, whilst solutions containing only 0.05 per cent. of that salt could only cause coloration of killed roots, or stems with open cut ends.

One other case is given of a Cherry Laurel which was treated with excess of sodium chloride with the object of killing it and seeing the effect produced in the leaves. The leaves curled at the margins, light brown areas, similar to the common "scorching" effect, were produced, and the leaves became brittle: symptoms somewhat similar to affected trees.

Finally a dissection was made of the roots and stems of the Cherry Laurel (*Experiment 1*), in which the symptoms of this disease had been reproduced.

The staining of the tissues in root and stem was exactly comparable with sections of Wisbech material (see fig. 78).

These experiments show that the blue coloration can be induced artificially in the roots and stems of Cherry Laurel and Privet by setting up conditions that may be expected to result in an increased absorption of iron.

#### CONCLUSIONS.

The problem requires further investigation before factors conditioning the disease can be definitely established. The following is suggested as the most likely working hypothesis.

The drought conditions of 1921-22 brought about an increased concentration in the soil solution, and, where this concentration was high, increased the permeability of the absorbing parts of the roots and brought about an abnormally high intake of salts into the plant.

With these salts was absorbed a large amount of iron. As it passed up the xylem vessels some of this iron was adsorbed by the living cells lining the vessels, and combined with the tannins in them to form a blue-black iron tannin compound.

If a filter paper be moistened in the middle with four or five drops of tannic acid and then a few drops of a ferrous sulphate solution be applied at the centre, a very good imitation of the coloration in root and stem will be obtained.

It is not possible to say at this stage of the investigation whether the death of the roots was the direct result of the rise in concentration of the soil solution, or whether it was an indirect result of the absorption of an excessive amount of salts. It is likewise uncertain if the formation of the iron tannin compound was an important step in the undermining of the health of the tree, or only a conspicuous but pathologically unimportant incident.

Indirect evidence that supports this view of an increased saline content is to be found in the dyke water in these and other orchards in the Wisbech district.

This contains a high percentage of salts, and in some orchards scorching of the leaves has occurred when this water was used for soft soap and nicotine spraying, whereas in the same orchard no scorching occurred when the Wisbech Water Company's water was used.

The following analysis of dyke water from Murrow, near Wisbech, was made by Mr. CODLING :

WATER FROM J. E. SANDALL, SEADYKE, MURROW.

1924-25.

	Grains per Gallon.
Residue dried at 100 C.. . . .	278.4
Chlorine . . . . .	43.38
Sodium Chloride . . . . .	71.58
Calcium Oxide . . . . .	45.97
Magnesium Oxide . . . . .	20.75
Sulphuric Acid (SO <sub>3</sub> ) . . . . .	91.17
Soluble Silica . . . . .	0.42
Alkalinity calculated as CaCO <sub>3</sub> . . . . .	25.55
Nitric Acid, Halogens . . . . .	Traces

This water required 21.6 of commercial fish-oil soft soap to soften 100 gallons of water. Other dyke waters near Wisbech are still harder than this.

Further evidence supporting this view is that all the slightly and moderately affected trees recovered in 1924 and have not since shown any of the above symptoms.

These observations are placed on record as a starting point for further investigation, in the event of the recurrence of this peculiar dying of fruit trees, which might possibly occur in the Wisbech district under conditions similar to those of 1921-22-23.

SUMMARY.

Observations made on the dying of fruit trees in the Wisbech district in 1923 show that the cause of death was not due to a parasitic organism and that the trouble was not contagious.

The hypothesis (with evidence supporting it) is put forward that the cause of death was due to the increased saline concentration of the soil water due to the drought of 1921-22.

We wish to record our thanks to Mr. W. G. KENT (Horticultural Superintendent for the Isle of Ely) for making a preliminary survey of the affected area and for assisting us in making the above observations, and also to Mr. M. C. VYVYAN for criticisms.

## THE GALL MIDGES OF VEGETABLES AND MARKET GARDEN CROPS.

By H. F. BARNES, B.A. Oxon.

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### Introductory.

THERE are a number of gall midges (*Cecidomyiidae*) which occur on vegetables and market garden crops. Some of these do considerable damage in certain districts, while others are of less importance. In all cases the means of control are only very vaguely known at present. The midges which do most damage are the Swede Midge (*Contarinia nasturtii* Kieff.), the Pod Midge (*Perrisia brassicae* Winn.), and the Pea Midge (*Contarinia pisi* Winn.).

#### A. Attacking Crucifers.

1. The Swede Midge (*Contarinia nasturtii* Kieff.).
2. The Pod Midge or Turnip and Cabbage Seed Midge (*Perrisia brassicae* Winn.).
3. The Colza Flower Midge (*Perrisia raphanistri* Kieff.).

#### B. Attacking Peas.

The Pea Midge (*Contarinia pisi* Winn.).

#### C. Attacking Mushrooms.

The Mushroom Midge (*Pezomyia speyeri* Barnes).

#### D. Attacking Vegetable Marrows.

The White Bryony and Vegetable Marrow Midge (*Perrisia bryoniae* Bouché).

#### E. Attacking Parsnips.

1. *Kiefferia pimpinellae* Löw.
2. *Macrolabis corrugans* Löw.

### A. Attacking Crucifers.

There are three midges which attack many Crucifers, such as cabbages, turnips, rape, radish, etc., and also beets, and these may be distinguished most readily by the damage they do and the part of the plant they attack. The Swede Midge larvæ feed on the tissues at the base of the leaves, causing "crumple-leaf" and "many-neck" condition, in swedes especially. The Pod Midge larvæ live in the pods and prevent proper seed crops, especially in colza and rape. The third midge, Colza Flower Midge, lives in the larval stage in the flowers of many Crucifer crops, causing a swelling and preventing the formation of fruit.

I. THE SWEDE MIDGE (*Contarinia nasturtii* Kieff.).

This pale lemon-coloured midge does serious damage to swede crops, as well as to other crops such as turnip, rape, cabbage, and radish; it also occurs on wild plants such as charlock, marsh watercress (*Radicula palustris*), and creeping watercress (*R. sylvestris*). It is widely distributed all over Europe and England, especially in Yorkshire, Kent, and Sussex. TAYLOR\* worked out the life-history in some detail and came to the conclusion that "crumple-leaf" condition in swedes is due solely to the attack of the midge, which is also one of the causes of "many-neck" in swedes. Usually the first appearance of the midge is early in June, when the lemon-coloured midges may be seen flying in large numbers between the rows of the crop. The eggs are deposited on the leaves, sometimes on the upper surface of the blade but more frequently on the upper surface of the stalk, the younger leaves in the heart of the crown being selected. Hatching out in a few days, the larvæ feed on the juicy tissues of the leaves, always keeping on the surface. In three or four days the damage appears. The stalks become swollen and, bending sharply inwards across the top of the plant, press upon the terminal bud, while the leaves become crumpled. This damage retards the growth of the plant and at the same time protects the larvæ from any spray which may be used against it. When fully grown, in about three weeks' time the whitish-pale yellow larvæ "jump" to the soil, where they remain in the pupal cases, which are enclosed in silk cocoons covered with particles of soil, for two to three weeks. The second brood of midges then emerges and at once seeks another crop of Crucifers on which to lay their eggs. If the weather is warm there may be four broods in the course of a year, but usually there are three. These broods continue up to September, when the larvæ "jump" to the soil and remain there during the winter.

The damage done to the plants is believed to cause a definite loss in weight of the roots of the plants owing to the delay in growth. DRY† came to the conclusion that the early sown fields were most severely attacked. He also found that the fields near the sea coast in Yorkshire were less severely attacked than those farther inland.

Small spiders and an Empid fly have been recorded as attacking the adult midges, while DRY reared some Proctotrypid flies from the larvæ.

*Control.*—It has been suggested to plant a trap crop of the vegetables round the fields on which there were previously similar crops, and as soon as the midges had laid their eggs on these plants in June they were to be gathered and burned. A more satisfactory method has also been suggested, i.e. delay sowing the crop until time has elapsed for the first brood to have hatched and died without being able to lay their eggs. Care should be taken to see that there is no wild charlock or watercress nearby, as the midges would simply migrate to these

\* "Cabbage-Top in Swedes," *University of Leeds Bulletin*, No. 82, 1912.

† *Ann. App. Biol.*, London, ii. pp. 81-108, 1915.





(Photo by F. Edenden,  
[*Contarinia nasutif* Kieff].)

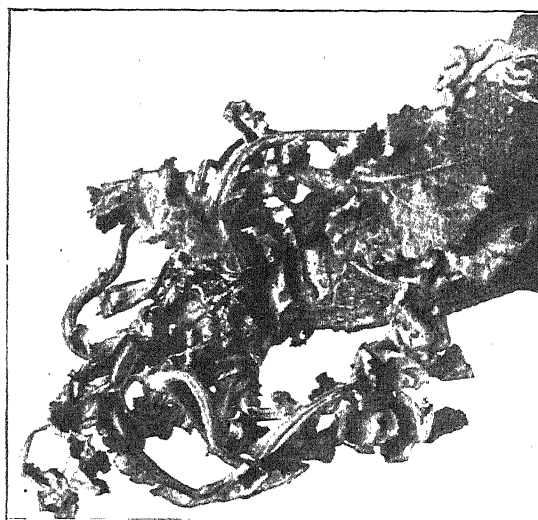


FIG. 79.—MANY-NECKED SWEDES, DUE TO ATTACK BY THE SWEDE MIDGE (*Contarinia nasutif* Kieff).  
[To face p. 332.]



[Photo by F. Edenden.]

FIG. 80.—YOUNG SWEDES ATTACKED BY THE SWEDE MIDGE (*Contarinia nasturtii* Kieff.), SHOWING ABNORMAL SWELLINGS ABOVE THE ROOTS.

plants. Spraying is of no use owing to the inability of the spray to reach the larvæ.

## 2. THE POD MIDGE (*Perrisia brassicæ* Winn.).

This midge, which is also termed the Turnip and Cabbage Seed Midge and is blackish-brown, attacks several Crucifer crops, including rape, turnip, radish, mustard, and swedes, as well as beets, and is recorded from most European countries. In 1911 there was a bad attack in Romney Marsh in swede seed pods. In Cambridgeshire, where this midge is fairly common, the damage it causes is known as the "bladder pod." The larvæ are white, do not "jump," and live gregariously in large numbers, in the siliques of colza especially, where they prevent the formation of seed, as many as 50-60 being found in a single pod. The chief sign of attack is a premature yellowing found at the place where the larvae are sucking. Attacks of this midge are said to occur only when the Cabbage Pod Weevil (*Ceuthorrhynchus assimilis* Pyk.) is present. This is because the adult midges have been observed ovipositing in the pods through the punctures made by the pod weevils. All writers, however, do not agree; LABOULBENÉ states that the ovipositor pierces the pod. At any rate when these weevils are present the attack of the pod midge is more serious. The larval stage takes about four weeks, while pupation takes place just below the surface of the ground. There are several generations of the midge during the summer, up to six if the weather is warm and the pod weevil is present. The larvæ of the last generation of the summer remain pupate in the soil throughout the winter.

There are three hymenopterous parasites, two Chalcids and one *Plastygaster* sp., which attack the midge larvæ on the Continent. SPEYER\* has found that in one season 68 per cent. of the midge larvæ were parasitized by two Chalcids, but the overwintering midge larvæ escaped the parasites to a certain extent, one of the Chalcid parasites not being found later than September.

*Control.*—No remedy is yet known, but deep ploughing will destroy overwintering larvæ. It has been found that when summer crops of rape are grown immediately following winter crops there is a great increase of the midge. Measures which will destroy the weevil will also help in the control of the midge.

## 3. THE COLZA FLOWER MIDGE (*Perrisia raphanistri* Kieff.).

This midge, which is yellowish-brown, is also common in Europe. In England it is found in districts as far apart as Northumberland and Kent. The larvæ are white, do not "jump," and live several together in the flowers of a great number of Cruciferae, e.g. cabbages, turnips, radishes, colza, etc. It is not usually present in large enough numbers to do much damage. The larvæ cause the flowers to swell and become deformed, as a result proper formation of the fruit is prevented. The

\* *Arb. Biol. Reich., Land- u. Forstw.*, xii, pp. 79-108 (Berlin, 1923).

flowers when attacked become deformed, the calyx being enlarged and the corolla remaining short and shut, the stamens are shorter than usual, while their filaments are greatly swollen, the ovary being hypertrophied. There are at least two generations in the year, in spring and summer, the latter generation remaining throughout the winter in the soil. Three hymenopterous parasites have been found attacking the midge larvæ on radish in France.

No control has yet been recorded.

### B. *Attacking Peas.*

#### THE PEA MIDGE (*Contarinia pisi* Winn.).

This midge is pale brownish-yellow. It occurs throughout Europe and all over England. In 1907 it did a great deal of damage to peas in Kent and Worcestershire, while in 1919 and 1920 it caused considerable damage to peas and beans. The adult midge lays its eggs during June in pea pods and less often in bean pods. The larvæ are white, live together in batches of 20-40 usually, and can "jump." As many as 300 may be found in one pod, and this makes them very obnoxious, as they may get among peas to be served up at table and among shelled peas for market, thus lessening their value. The larvæ do not destroy the peas but feed apparently on the inner part of the shuck, producing a curious gouty or swollen deformity of the pods. They also stunt the growth of the pods, especially in length. WINNERTZ states that he hatched the adults in July, while TASCHENBERG says that they hatch out in four weeks into adults which live through the winter; thus there may be two broods in the course of a year. At any rate larvæ on becoming full grown "jump" from the pods to the soil, where they pupate and pass the winter. Early peas are very rarely attacked, the main crops suffering most. "It has not been seen in dwarf peas such as 'William Hurst,'" so THEOBALD writes in 1907,\* "but in 1905 it was reported from several parts of Great Britain as decidedly harmful to all kinds of peas, especially Marrowfats." Dr. HARRISON, however, writes † that late varieties like 'Gladstone' were unharmed, but Earlies and Second Earlies like 'Senator' and 'Leader' were heavily infested. This difference may perhaps be explained by the fact that Dr. HARRISON was writing of an attack in the north, i.e. Northumberland. The damage must be distinguished from that caused by the "Pea Maggot," which possesses legs, while the midge larva has none. A hymenopterous parasite has been bred from the larvæ on the Continent, and the larvæ of a predaceous midge have been found eating the larvæ in Kent.

*Control.*—Burning all infested plants as soon as the crop is gathered is recommended. If the deformed pods are left, the larvæ will escape to the ground. The land should be deeply trenched and rolled in the autumn and winter. The following spring it should only be top worked.

\* *Rep. Econ. Zool., Wye*, pp. 107-109.

† *Entomologist*, lvii. 1924, p. 8.

C. *Attacking Mushrooms.*THE MUSHROOM MIDGE (*Pezomyia speyeri* Barnes).

This is a reddish-orange midge. The larvæ are orange, as also are the pupæ. The former may be found living on the mycelium of mushrooms grown under glass; they are not gregarious. The pupæ may be found a small distance under the surface of the soil of the mushroom bed. They are active, and will bury themselves if placed on the surface of the soil. They are not enclosed in any cocoon. This midge has only recently been discovered by Mr. E. R. SPEYER at Cheshunt, Herts, and described.\* It is not known to occur in sufficient numbers to be regarded as a serious pest.

No control has yet been devised.

D. *Attacking Vegetable Marrows.*THE WHITE BRYONY AND VEGETABLE MARROW MIDGE  
(*Perrisia bryoniae* Bouché).

A lookout must be kept on vegetable marrows for this dark brown midge, which is reported from France as a pest of vegetable marrows. The larvæ are white and live several together. In Great Britain, as well as on the Continent, the larvæ are frequently found living on White Bryony (*B. dioica*). The extremities of the shoots are attacked and become deformed. The larvæ live in a cluster of malformed leaves, which become rosette shaped, resembling a bud the size of a cobnut. The larvæ are in the shoots in June and July and the midges hatch in July. The pupal stage takes about 8-14 days. Probably there is another generation in the late summer and autumn which pupates in the soil during the winter months.

Neither control nor parasite has so far been recorded for this midge.

E. *Attacking Parsnips.*

Two midges (*Kiefferia pimpinellæ* F. Löw and *Macrolabis corrugans* F. Löw) are reported by NOËL (*Bull. Lab. Régional d'Entom. Agric. Rouen*, pt. 4, 1913) as pests of parsnips in France. There is, however, no record so far of either of these midges attacking parsnips in such numbers as to be a pest in Great Britain, although both are fairly common.

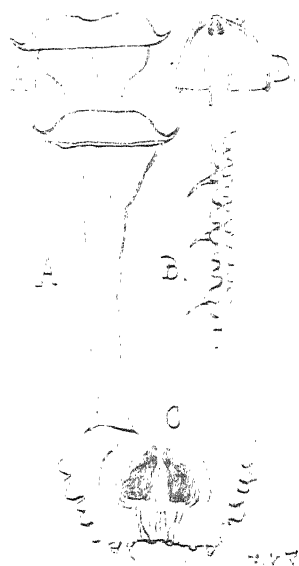
The larvæ of the former midge (*Kiefferia pimpinellæ* F. Löw) live in the swollen fruits of a large number of Umbellifers. In Great Britain they are recorded from Wild Angelica (*Angelica sylvestris*), Burnet Saxifrage (*Pimpinella saxifraga*), Parsnip (*Peucedanum sativum*), and Wild Carrot (*Daucus carota*). The larvæ are yellowish and pupate in the soil. The infested seeds are swollen, and each contains a single

\* *Ent. Mo. Mag.* 1926, pp. 89-92.

larva. In Wild Carrot sometimes the floral axis and peduncles as well as the seeds are swollen, and the latter may be easily picked out as they are raised above the inflorescence, and are either violet or brown.

The latter midge (*Macrolabis corrugans* F. Löw) is bright orange with dark markings of brown. The larvæ are whitish and cause a folding of the leaves, pupation taking place in the soil. In Great Britain this midge has only once been recorded from Parsnip (HALL, *Entomologist*, 1918, pp. 152-3), and that was in Kent. However, there are numerous records from all over England recording it from Common Cow-parsnip (*Heracleum Sphondylium*), while less frequently it occurs on Savoy or Shrubby Hawkweed (*Hieracium boreale*), Hedge Woundwort (*Stachys sylvatica*), White Dead Nettle (*Lamium album*), and a variety of Cow-parsnip (*Heracleum Sphondylium* var. *angustifolium*).

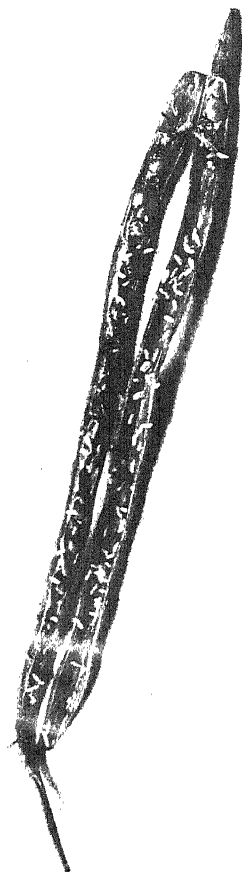
No control has yet been recorded for either of these midges.



[With permission of F. V. Theobald.]

FIG. 81.—LARVÆ OF THE POD MIDGE.  
(*Perryia brassicae* Winn.).

A. Anchor Process; B. Skin; C. Anal  
Segment; D. Head. (Greatly enlarged.)



[Photo by C. A. W. Duffield,

FIG. 82.—OPENED POD OF CRUCIFER, SHOWING LARVÆ OF THE POD MIDGE  
(*Perrisia brassicae* Winn.).

[To face p. 337.



## THE AWARD OF GARDEN MERIT.—VIII.

By F. J. CHITTENDEN, F.L.S., V.M.H.

THE grounds upon which the Award of Garden Merit is awarded and the reason for the establishment of this award were set out in our JOURNAL, vol. 47, p. 189 (1922), at the head of the first list of plants to receive it, but it may be useful to repeat them here.

This award was established in order to mark plants of proved and outstanding excellence for garden use. It is bestowed by the Council of the Royal Horticultural Society on the recommendation of the Wisley Garden Committee, generally but not exclusively to plants which have been thoroughly tried at Wisley. It may be given to plants long grown in our gardens as well as to more recent introductions, provided they are of outstanding merit in their class and do not require very special treatment to bring out their excellencies.

Fifty-four awards have already been announced and descriptive notes upon the plants have been published in our JOURNAL. The following are recent additions to the list :

55. RHODODENDRON  $\times$  NOBLEANUM.

*Award of Garden Merit, January 19, 1926.*

Nearly a hundred years have passed since *Rhododendron*  $\times$  *Nobleanum* was raised at the Knap Hill Nursery by crossing *R. arboreum* with *R. caucasicum*, but of all the many crosses into which *R. arboreum* has entered *R.  $\times$  Nobleanum* is the most reliable. It is true that favourable weather is required for it to give its best, but even though this may not be possible in every season, yet, since its flowers come in January and February, when they do escape frost they are very welcome. In sheltered gardens where north and east sides are protected, *R.  $\times$  Nobleanum* will attain a height of ten to fifteen feet and will generally produce its bright rose trusses of flowers with greater or less freedom according to the severity of the weather. Before planting, it would be well to see the colour of the flowers of plants available, for the cross has been made many times, and (since *R. arboreum* is one of the most variable of Rhododendrons) the results are not always the same.

56. RHODODENDRON  $\times$  PRAECOX.

*Award of Garden Merit, January 19, 1926.*

Like other early-flowering Rhododendrons, *R.  $\times$  praecox* is apt to have its flowers cut by frosts, and in some years they are destroyed before they are fully open, but they escape sufficiently often to warrant

everyone with a Rhododendron soil in planting it, for no bush is more welcome than this when in full flower, sometimes as early as the end of January at Wisley, sometimes not until March. The flowers are bright rosy purple, each  $1\frac{1}{2}$  to 2 inches across, in small clusters; and the leaves are dark glossy green. The plant makes a rather spreading bush about 3 to 4 feet in height at Wisley and is perfectly hardy, but in some seasons it loses most of its leaves like *R. dauricum*, one of its parents, the rather tender *R. ciliatum* being the other. The bushes of the latter at Wisley are very frequently damaged by frost, while *dauricum* and  $\times$  *praecox* appear quite hardy. This hybrid was raised by Mr. DAVIES at Ormskirk about 1860, and is well known in gardens. It is in all ways a better plant than *dauricum*, with larger, brighter flowers, and more showy when the flowers are open.

#### 57. SCILLA BIFOLIA.

*Award of Garden Merit, February 16, 1926.*

If a planter were to take as a guide to his choice of plants those which have been given the Award of Garden Merit, and those alone, his outdoor garden would not be devoid of flowers for many days during the year, and it would certainly contain more flowers in January and February than do many now existing. Many of them are lowly things coming in their native haunts thus early to avoid the lush and overpowering growth of their fellow occupants of the ground when spring and high summer hold their sway, and many of them need not long occupy their spot of ground, but can be best planted, like this, where other plants will develop their growth later on. *Scilla bifolia* flowers in February and early March, coming just as *Crocus Tomassinianus* is passing, and at its best before *Chionodoxa Luciliae* and *C. sardensis* appear to carry on the blue carpet under the shrubs and trees. It is of no real use in bedding-out schemes, but should be planted in no niggard spirit (in September or October) where it may remain to seed and multiply, in broad masses left to themselves, all but its beauty forgotten till another winter's end brings another feast of blue.

The plant is very much like the *Chionodoxas*, and it not infrequently crosses with them, giving the *Chionoscillas*. It has usually two linear leaves about  $\frac{1}{2}$  inch wide and 4 to 6 inches long, hooded at their tips, and the flowers are borne on a stem rising from between these leaves to about 6 inches in height. The typical colour is blue and the segments spread so as to make a flower about  $\frac{3}{4}$  inch across. It has been cultivated in English gardens for many years, and has a wide range in nature through France, Spain, Italy, the Balkans, South Russia, Caucasus and Asia Minor, and like most plants with a wide range has varied a good deal.

As many enthusiastic gardeners know, it adds greatly to the interest in our plants to collect and grow and compare the forms of one species from various parts of its range, and to proceed from that to the raising of seedlings which are almost certain to increase the

range of variation which nature has provided. (Seedlings of *Scilla bifolia* are not long in reaching flowering size.)

Perhaps a list of the forms of this species which have been described may be of interest, and lead some to raise seedlings which will give varieties beyond those already known in a very charming, easily grown plant. To this list we have added a note of an illustration of the variety where such exists and may be seen in the Library at Vincent Square.

The figure in Reichenbach's *Icones* X, t. cccclxiv, fig. 1015, may be taken as the typical plant which grows in fields, on grassy hillsides and bushy places and in orchards, mainly in Southern Europe.

- var. *bracteata* with long bracts below the flowers up to nearly  $\frac{1}{2}$  in. long; forma *rubra* has reddish-purple flowers, and forma *alba* white.
- var. *praecox* (see Sweet, *Brit. Fl. Gard.*, ser. 2, t. 141), from Bosnia, etc., larger and stronger in all its parts, having up to ten flowers on a spike.
- var. *taurica* (see Regel, *Gartenfl.* ix (1860), 373, t. 307), from the Balkans and the Crimea, generally with 3 to 5 leaves and very long pedicels, and its sub-var. *laxa* with rather grey-green leaves and smaller flowers.
- var. *multiflora*, with many flowers on a spike, and the following garden forms :
  - rosea*, with reddish flowers;
  - virescens*, with bright green leaves and a green stripe along the middle of each segment;
  - albiflora*, with white flowers;
  - grandiflora*, with large and very showy flowers.
- var. *rivalis*, with narrow leaves less than  $\frac{1}{4}$  inch wide, and only one to four small flowers on a spike, from the alpine regions of Carpathian Silbenburg, where it flowers in August.
- var. *Kladnii* from the same district, with extremely short stalks to the flowers, reminding one of *S. amoena*.
- var. *gracillima*, very slender, with narrow linear leaves and only one to three flowers on a spike, from the same district.

The common garden form is illustrated in the *Bot. Mag.*, t. 746.

NOTE.—For earlier annotated lists of Awards of Garden Merit, see vols. 47, p. 189; 48, pp. 58 and 223; 49, p. 233; 50, pp. 100 and 260; and 51, p. 84.

## BOOK REVIEWS.

"Täppan som sommarnöje. Trädgårdsboken för nybörjaren." Av Henry B. Goodwin, Fil. Dr. [The allotment as summer delight. The garden book for beginners.] (Stockholm, 1925.) Sm. 4to. 130 pp.

Dr. Goodwin's attractive volume is really a history of the creation of a garden on barren soil in the island of Utö in the southern Stockholm archipelago. In his preface the author remarks: "I know a rich and inexhaustible source of health. It is a little, poor allotment on a bare hillside. What a garden allotment can offer us, only we who devote ourselves a couple of months each year to its care can tell to those who have once taken up gardening. But the town-dweller has in general never done so. He regards garden work as very hard, very time-consuming, and often thinks it more costly than it is. In a poor neighbourhood he may rear a green oasis in a few years and at inconsiderable expense. Work in fresh air is prescribed by a medical man in ninety-nine cases out of a hundred, when the circulation of the blood may be revived by change." The author proceeds to tell of his experience in a few years' practice, detailing it in chapters devoted to the consideration of the allotment as a source of health, its development on a bare hillside, its laying out, the window garden, evergreen plants, rockeries, climbing plants, perennial beds and their occupants, berries, vegetables and roots, tools and tallies, ornamental annuals, rainy summers, and wildernesses.

The text is embellished with eighty-six process blocks, and the illustrations even extending to both covers. For those who can read Swedish it is a very entertaining volume, but the engravings will repay the attention of even those who cannot make use of the text.

"Laboratory Outlines in Plant Pathology." By H. H. Whetzel, Lex R. Heslor, Chas. T. Gregory, and W. Howard Rankin. Ed. 2. Completely revised and rewritten by the senior author. 8vo. 231 pp. (W. B. Saunders Company, Philadelphia and London, 1925.) 15s. net.

The senior author states in the preface that "these outlines are intended for students taking a regular four-year course in college or university," but one gathers from the contents that such students should already be in possession of some knowledge of the fungi, bacteria, and mycology.

The chief aim of the authors seems to be the provision of elaborate instructions for advanced or research students in writing up a study of any particular disease. "This exercise is designed to acquaint the student with the means and characters of the more common symptoms and signs exhibited by diseased plants" and to assist him "in preparing a short paper (the term paper) on one of the diseases listed."

The outlines commence with detailed instructions in the making of drawings and the use to be made of fresh and preserved specimens. This is followed by a section on how to use the literature relating to any particular disease, how abstracts of these should be made, and how exactly references should be given in abbreviated form. A list of host plants (called by the authors "suscepts"), together with such of their diseases as may be suitable for a "term paper," is then given.

The main portion of the book deals with laboratory exercises in some fifty-two diseases arranged in three classes, Necrotic, Hypoplastic and Hyperplastic. These terms, strange to the English ear, are explained in a glossary at the end of the work, and in the words of the authors "present an important step in calling attention to the domination of systematic mycology in phytopathologic teaching and writing, and of directing it towards the more logical classification and study of diseases on the basis of the pathologic phenomena exhibited." Most plant pathologists will be in sympathy with this sentiment, but whether it is really necessary to insist upon such terminology is another matter.

The three main classes are subdivided into three or more groups; under the necrotic diseases are those caused by bacteria, those caused by fungi, and *Physiogenic* disease. This last contains one example called *Stippin* of apples. Curious to learn what these two terms might mean, the reader turns to page 123, there to find the heading "*Stippen*, not *Stippin*." Beneath it is written, "this disease is

known under a variety of names, Baldwin spot, bitter pit, and fruit pit being the *most* (reviewer's italics) commonly used." Then why, may it be asked, give prominence to a new term of doubtful spelling? The disease here concerned is what is usually known in this country as bitter pit, the cause of which is some physiological disturbance in the maturing of the fruit. The term physiological disease has been long established and is now in common use, and is to be preferred to "physiogenic."

Hypoplastic diseases are subdivided into those caused by viruses, e.g. mosaic, those caused by fungi, and those caused by phanerogams, e.g. dodder; while the Hyperplastic diseases comprise no fewer than five sub-classes, i.e. those caused by slime-moulds, bacteria, fungi, nematodes (wheat), and again Physiogenic, e.g. edema (intumescences).

In the text, each disease is considered under (1) symptomatology; (2) etiology. Under the first heading the student is carefully instructed to observe all the symptoms of the disease.

A few of these guiding remarks are in the form of questions, a very good plan which might with advantage have been extended. More often than not, however, the student is told very definitely what he ought to see. Under etiology, a brief historical note is provided, followed by a very clear account of the life-history of the parasite concerned, again in the form of guiding remarks as to what should be observed and noted.

Each account ends with references to the chief American literature relating to the particular disease.

References to European classical or recent research work are scanty, and in vain may the enthusiastic student search for references to the works of de Bary and Woronin.

It is certainly somewhat astounding to find in a book published in 1925, and alleged to be completely revised, the only references to research work concerning the oospores of *Phytophthora infestans* are to that of Clinton (1911) and Jones (1912). The work of Pethybridge and his collaborators from 1913 onwards finds no place.

Under damping off of seedlings due to Phycomycetes, de Bary is not mentioned, but Hartig is, the only other quotations being Rosenbaum (1915) and Hartley (1921). Of these Phycomycetes the author states, "it is one of two species that is usually responsible, either *Pythium Debaryanum* Hesse, or *Phytophthora Cactorum* (Cohn and Lebert) Schroeter (= *P. Fagi* Hartig)"—terminology not recognized on this side.

Apart from this failure to indicate the most important literature of both continents, the book is also open to the criticism that there are too many "outlines." One in each of the authors' subdivisions would have been ample for the purpose, particularly had the book been interleaved. As it is, in one section (Hypoplastic diseases) alone, three powdery mildews, four smuts and three rusts find a place, very useful to one pressed for time and cramming for an examination.

There are a number of misprints, but otherwise the type, paper, and binding are excellent.

As an insight into modern American methods of teaching, this work is certainly of value, and will in addition form a useful reference book, but to the British idea of laboratory training in mycology it may appear as providing rather too much mental pabulum.

"Spanish and Portuguese Gardens." By R. S. Nichols. (Constable, London, 1925.) 36s. net.

Italy, and especially the Italy of Ruskin, being thought a little *démodé* by the more frisky of our moderns, it is to Spain that Chelsea turns its steps to find colour and inspiration. Our landscape gardeners, so long swayed by Italian ideals, may follow, and here is a guide ready for their purpose.

The ordinary traveller, too, will find much wise advice as to routes and sights, and in this lies the strong point of the volume. The historian will look, too, at the chapters on early Spanish gardens, the Moorish and Persian influence upon them, and will, ungratefully, sigh for more. This important period of horticultural development yet lacks its Prescott—and how rich a field here waits the careful searcher!

Eastern ideas and ways had long battered at the back door of Europe, but effected no lasting entry. That remarkable wave of Arabic expansion which swept across Africa in the eighth century entered Europe by a flanking movement and there brought the mingled civilizations of East and West to a free and vivid flowering. For nearly eight hundred years the beneficent and tolerant Moslem rule fostered a culture and civilization in Spain which stood alone in

Europe and set, as it were, a colour scheme which dominates to this day. The Eastern influence in the more southern gardens is still noteworthy, and upon this is laid the Renaissance style, blown across from Italy, and still later the Baroque, which is now so rapidly being raised from a joke to a creed. Of this rich period we wish for a fuller and more documented record, but reviewers must restrain their far-away looks, and we therefore turn once more to the work before us.

The author's catholic mind takes, as it should, all gardens, ancient and modern, in her survey, and crosses to Majorca, that fortunate island, to explore El Raxa and other less-known pleasaunces.

We can recommend the book as a guide to Spanish and Portuguese gardens, but hope that it will be regarded by the author or some other student as but a prolegomenon.

The printing and illustration are adequate, but the many illustrations have brought in their trail a vastly thick and heavy clay-laden paper. None but a Hercules could contemplate arm-chair reading, and those who take it on their pilgrimage to the Iberian peninsula must be prepared to pay excess luggage charges.

"Ornamental Trees for Amateurs." By W. J. Bean. 8vo. 120 pp. ("Country Life," London, 1925.) 5s. net.

To condense within such small compass "descriptive and cultural notes on the best and most interesting hardy trees in cultivation" is a task which few would dare to undertake in these days of illimitable choice and multitudinous tastes. Yet this is what its author has successfully accomplished in the latest volume of the "Country Life" series. No man could be better qualified. His ripe experience stretches from days when well-furnished gardens were comparatively scarce to a period of wellnigh universal homage to horticulture and a bewildering wealth of selection. Clearly some guidance is necessary, and though our shelves testify to the unending flow of volumes poured forth with this laudable object few will be more welcome than this modest but illuminating production.

The author's main achievement has been to draw attention to some of the less well-known introductions of recent years, in the hope that as their merits become recognized they may displace the dull stereotyped stuff of the old villa-garden type.

We cannot illustrate this better than by drawing attention to the succinct description of the cherries, a class of infinite variety and charm, not demanding an undue amount of space or any recondite knowledge of culture. The same may be said of the crabs and maples. We are not sure, however, that it would be easy to follow his recommendations in all cases. Where, for instance, could we turn for specimens of *Meliosma Veitchiorum*, *Nothofagus betuloides*, or *Picrasma ailanthoides*? Such treasures are not in every nurseryman's catalogue—yet, at any rate. It is unfortunate, too, that space forbade the inclusion of a chapter dealing with conifers, though we observe that a few are appropriately recommended as shelter trees. Perhaps we may hope for a volume in this series dealing exclusively with them. We must not omit to commend the opening chapters on cultivation, transplanting, propagation, and so forth, which are full of sage advice. In this connexion we notice that on the vexed question of lopping the lower branches of young trees the author seems to favour the practice, not, we believe, universally approved. He will command more general assent in condemning the common error of planting too deeply.

In conclusion we warmly commend this little book, not only to the amateur for whose benefit it is mainly written, but to the professional nurseryman in the hope that he may be induced to create the supply for which it will most assuredly stimulate a demand.

"Aristocrats of the Garden." By E. H. Wilson. 8vo. 312 pp. (Stratford Co., Boston, 1926.) \$5.

This is a fresh issue of the book of which Mr. Wilson published a limited edition some ten years ago. The text appears to be almost identical, but a prologue of twenty pages, full of sage advice, has been added, together with an entirely new set of illustrations.

Mr. Wilson combines the experience of an indefatigable traveller and collector with a clear and attractive style. It is, therefore, not surprising that this happy combination recently won for him the Veitch Memorial Medal of the Royal Horticultural Society, "for his introductions to gardens and his books."

Though written principally for American readers, garden-lovers in this country will find much applicable to their gardens in this fascinating volume. Perhaps the most interesting chapter is the last, "The Story of the Davidia."

It was principally to send back seed of this tree that Mr. Wilson set out on the first of his four visits to China twenty-seven years ago. It had been discovered by Père David in 1869, and Dr. Henry's description of it in 1888 induced Messrs. Veitch to endeavour to introduce it into this country, though seeds had meanwhile been sent by Père Farges to M. Vilmorin.

The thrilling account of the labour and risks encountered in tracing it is well told, and, as a result, the *Davidia*, though perhaps not quite realizing the glowing description in England, is an ornament of not a few gardens to-day.

We agree with Mr. Wilson that it is the most interesting and beautiful of all trees which grow in northern temperate regions, but as we know it in this country it must give place to the Horse-Chestnut.

The Lilies, the Rhododendrons, the Cherries, and many more plants, are likewise described with knowledge and discernment, and we have no hesitation in endorsing the statement in the "jacket" that the "Aristocrats" answers the perennial question: "What is best in plants?"

"Italian Gardens of the Renaissance." By J. C. Shepherd, A.R.I.B.A., and G. A. Jellicoe. Folio. 22 pp., 92 plates. (Benn, London, 1925.) £5 5s.

The gardens of Italy, one hopes, stand for all time, and not even the wealth of America is likely to challenge successfully these marvellous products of artistic skill.

Many of them appeal most strongly to those who are able to detach them from their present surroundings and condition, and plunge backwards into the days of romance in which they were conceived. And the same power of detachment assists greatly the enjoyment of their beauties in detail. Judicious omission of what the eye cannot avoid undoubtedly enhances the pictorial value of photographic reproduction, and enables one to appreciate better the brilliant work of the garden artists of five hundred years ago.

A new book of photographs and interesting drawings and plans has been produced by the authors, and it is so good that we hope they will be well rewarded for their industry and enterprise.

We think most of the gardens represented have been illustrated in other works, but new standpoints have been chosen for many of the photographs, and many details of great interest are emphasized in a manner to afford a wealth of instruction and example to students of architecture, gardening, and sculpture.

The authors give an introductory historical sketch of the architecture of the gardens of Italy, which merges into an essay on the principles that underlay the work of the great designers of the Renaissance. They illustrate their points by references to the examples published.

An unusual feature is a chronological table indicating the approximate dates of construction of the gardens named.

Space does not allow us to say all the nice things which we think this work deserves.

"English Gardens." By H. Avray Tipping, M.A. Folio. 375 pp. ("Country Life," London, 1925.) £3 3s.

One knows before opening a book on English gardens by Mr. Avray Tipping that it will be good, and worthy alike of the author and the subject on which he writes with so much judgment.

"English Gardens" illustrates and describes in the manner with which readers of "Country Life" are familiar no fewer than fifty-two gardens as they are to-day. The selection must have entailed great patience and discrimination. It is in the result very representative and covers a wide range of method and manner of design, ranging from Chatsworth to Gravetye and Munstead.

Through all of them, however, runs the catholicity of spirit which we flatter ourselves to be characteristic of the nation in matters other than gardening, and which finds particularly happy expression in the one art in which we may claim to excel. In his introduction Mr. Tipping surveys rapidly but clearly the development of gardening in this country from the earliest times. He points out that many of the examples illustrated possess links more or less strong with the past, so that despite alterations one may get through them a glimpse of what Tudor, Stuart or Hanoverian gardens were like. The author shows the eclectic taste of the English, and how, out of a medley of classic, Gothic and Oriental styles, strongly tinged with the English landscaping of the eighteenth century, the most appropriate features have been seized upon, so that something like definite ideas have developed into a modern style of English gardening. "We form our gardens on broad lines, valuing remnants of the old but full of zeal for the

new." We are glad to note that an authority on architectural gardening should conclude his introduction with the remark that "the right and spacious setting of the infinite number of beautiful trees and flowering shrubs on broken grounds and woodland wastes is a development which rightly excites and occupies the garden lover of to-day." Mr. Tipping's book is a necessity to every garden lover. As for the manner of its production and the quality of the beautiful photographs which are reproduced, it is only necessary to name the publishers.

"Myths and Legends of Flowers, Trees, Fruits, and Plants in all Ages and in all Climes." By Charles M. Skinner. 8vo. 302 pp. (Lippincott, London, 1925.) 12s. 6d. net.

The second edition of this book was reviewed in R.H.S. JOURNAL xl., pp. 605-606. It is stated that this is the fifth impression, with additional illustrations. It appears to be an exact impression of the second edition, with the exception of the six additional plates, and therefore any criticisms in the review of the second edition can still be applied to this impression.

"Les Petits Secrets du Jardinier Potagist." By Antoine Rivoire. (Author, 16 Rue d'Algerie, Lyon.)

This little pamphlet, coming from the very culinary Mecca of France, will have respectful consideration of all gourmets. The writer gives us some valuable hints as to the best vegetables and their methods of cultivation. To follow the alphabetical presentation: under Asparagus the author strongly advises the use of one-year plants in making new beds. In Aubergines our attention is called to the variety 'Monstreuse de Japon' which lacks the bitterness of some kinds.

For *Carottes à la Vichy* we must use the *Carotte rouge courte à chassiss*—or more tersely, *Grelot*.

In Vegetable Marrows the variety Olive is recommended. Watercress we may grow without running water by making a pavement of inverted wine bottles, choosing those with a good "kick" in them. The cuttings are struck between the bottles with frequent waterings to follow.

The author strongly recommends the increased use of Fennel—the Finocchio of Italy—and the reviewer agrees, but with the proviso that it is not to everyone's taste. The great secret of its successful culture is late sowing, about the middle of July.

The use of the young leaves of Lettuce thinned from the seed bed is advised, and we learn that this is known as *Salade des Moines*, another tribute to the monkish appreciation of earth's good creatures. In the section on Leeks an interesting point is made that seed raised in the North produces hardier plants than that grown in the Midi. Radishes grow best when sown two centimetres deep, *Scorzonera* is greatly improved by being sown in July and allowed to grow the second year, the Gooseberry or Currant Tomato should be grown for pickling in vinegar, etc. etc.—such are some of the very interesting and valuable tips given.

A final chapter in the Brillat-Savarin style introduces us to the three social hierarchies of vegetables—noble, bourgeois, and roturier—but this is too provocative for treatment in these pages. In all a useful and amusing pamphlet to add to our shelf of cookery books.

"Fruit Growing." By William Henry Chandler. (Constable, London.) 21s. net.

The literary output of American pomologists is prodigious. Hardly have we digested the recent "Fundamentals of Fruit Production," by Messrs. Gardner, Bradford, and Hooker, when the Professor of Pomology in California comes into the field with a volume of nearly eight hundred pages for our consideration and study. And so fast do pomological events move in the States that we must perforce sit down and master the progress of the three years that have intervened between the two volumes.

It must be said at once that this is no book for the tyro; it is a discussion for the advanced student of recent research in fruit-growing, and the beginner will find no help as to the right way to prune save in a very generalized sense.

Equally it is no book for the reviewer. The author gathers from State Bulletins and other sources all recent experimental work under such heads as Fruit Bud Formation, the Rest Period, Water Responses, Self-Sterility, etc., and the labour in so doing must have been immense. No fewer than 1,384 references are given in the bibliography.

In so vast a survey we cannot expect much critical appraisal of results. The frequent phrase "seemed to find" shows a judicious caution, but the



hungry searcher for dogmatic advice will be left a little empty. Seldom indeed does the author include his personal opinion, and the value of the book rests mainly in its summary of the investigations reported.

As a general criticism we think the author, like many of his kinsmen, relies rather too much upon the printed word. For example, in treating of the effect of scion upon stock, he quotes (p. 97) "Shaw seemed to find the stock is so influenced." A half-hour in a nursery among a bed of Pears on Quince Stocks would have demonstrated beyond a peradventure that a vigorous pear will make a vigorous root and a weak one roots less strong on the same stock.

Again, on the Compatibility of Stock and Scion it is stated that "the subject has had little careful study." It is true that little has been printed on this matter, but it is obvious that nurserymen, even the dullest, must after several hundreds of years have gained some knowledge of this subject, ignorance of which would entail serious loss.

A chapter of great interest is that on the Self-Sterility of Fruits, and the author well shows how cautious we must be in accepting evidence on this subject, by its very nature negative. Fruit fails to set for many reasons, of which pollination is only one, and here, as elsewhere, we come up against our ignorance of plant physiology. The vital processes of plant life still in many ways elude our research.

Why should, for instance, the apple 'Ben Davis' under experimental methods fail to set fruit with its own pollen, and yet an orchard of one hundred acres of this variety alone "generally set good crops . . . when the weather is warm and sunny at blossom time"?

Much remains to be done before we can give the hard-cut advice which the grower desires.

A point for the critic is a tendency to generalize from special cases, a most dangerous practice anywhere, but especially in horticulture. The discussion of alternate cropping of apples, for instance, when only late varieties are considered, may conceal a very useful hint. Why do early apples usually fruit more regularly than late?

Such criticisms, however, must not be allowed to overshadow our gratitude to the author for his masterly summary of recent research, a work which he tells us has taken nine years, and been completely written four times.

All interested in the study of fruit cultivation, and especially all those who are engaged in the teaching of horticulture, will find it indispensable. Finally, a word of praise is due to the selection of the pleasant cream-toned paper, which makes reading comfortable, and to the excellence of the unnamed printer.

"The Classification of Plants." Vol. II., Dicotyledons. By A. B. Rendle, M.A., D.Sc., F.R.S., P.L.S. Pp. xix + 636; 279 text figures. 8vo. (Cambridge University Press, 1925.) 30s.

The author is to be congratulated upon the completion of a task undertaken many years ago. In 1904 the first volume, on Monocotyledons, came out, and the gap of twenty-one years has been due to official duties which have hindered the speedy completion of the work. The experience gained in the Keepership of the Department of Botany, British Museum, has been turned to account in dealing with the details of structure and arrangement. The text figures are, in many cases, original, some borrowed (with due acknowledgment), and always informing and well chosen. The method employed is that of Engler with certain changes. Bibliographies are appended to each family for further reference.

"Vaste Planten en Rotsheesters." Door John Bergmans. 4to. 709 pp. (N.V. Drukkerij Voorheen De Erven Loosjes te Haarlem, 1924.)

Under the above title, which freely translated means "Hardy Perennials and Rock Shrubs," the author has compiled for his countrymen a valuable book of reference for those interested in hardy herbaceous borders and rock gardens. A better title would have been "Hardy Perennials and Rock Plants," as a very exhaustive list is given of alpine.

The book consists of 709 pages of well-printed matter on good surface paper. About 8,000 species and varieties of hardy plants are fully described, with their habitats and the names of their introducers. Their heights and periods of blooming are added, with much other useful information. For the amateur, valuable plans and instructions are given for the planting of borders and formation of rock and water gardens. There are altogether 153 illustrations in the book, being reproductions from photographs, nine of them being printed on art paper and very good.

The issue of such a book as this in Holland shows how the influence of English gardening is making itself felt in that country. A comparatively few years ago very little private gardening was done there. Plenty of handsome villas were to be seen, but their gardens were poor in many cases, very little money being spent on them. Now it appears the greatest enthusiasm has arisen among the Dutch for the making of rock and wall gardens, and water gardens, and for the improvement of their gardens generally.

In his preface Mr. John Bergmans claims that his book is the first work of the kind to be published in Holland. We can only congratulate him on its general excellence.

"Methods of Descriptive Systematic Botany." By Albert Spear Hitchcock. 8vo. vii + 216 pp. (Wiley, New York, 1925.) 12s. 6d. net.

The following extracts from the preface will give a notion of the author's intentions.

"De Candolle's '*La Phytographie*,' published in 1880, is the only book devoted to the subject, and that, naturally, is out of date, many problems having developed since it was written. Descriptive taxonomy at present may be likened to a craft, in which the art or technique has not been committed to writing, but is handed down by tradition. . . . In his opinion, the beginners in taxonomy to-day, as well as somewhat more advanced students, might well profit by the time that has been spent and the pains that have been taken to further this development, as well as by the mistakes that have been made. . . . Along with the strictly taxonomic development of the subject, there have been included chapters or paragraphs dealing with more or less related subjects which it was thought might be helpful."

In carrying out his purpose, the author writes of genera and species, with their larger and smaller categories, nomenclature, abbreviations, the use of floras, identification of plants, the preparation of local floras, field-work, and work in herbarium and library. He also discusses homonyms and synonyms, types, and travelling. The last item applies to New World regions, for the author has avoided discussion of the local conditions of wet regions, such as the Khasia Hills, which demand special attention for drying plants.

The beginner may well benefit by studying the author's recommendations, as his conclusions are candidly stated and well worth consideration.

"Familiar Flowers of Field and Garden." By F. Schuyler Mathews. (D. Appleton & Co., New York and London.) 10s. 6d.

This is a revised edition of a useful little handbook of the commoner plants of the Northern United States. They are arranged according to the months in which they flower. Besides full-page illustrations from photographs, there are more than 200 pen drawings by the author that give a very fair idea of the general appearance of the plants.

A systematic index at the end gives names, colours, and localities, as well as times of flowering.

"Natural History of British Butterflies." By F. W. Frohawk. Two Vols. (Hutchinson & Co., London.) £6 6s.

Eden Phillpotts wrote that there are two sterling tests of a true gardener to be found in his attitude towards nurserymen's catalogues and butterflies. He should love the former and even believe in them, but hate and mistrust all diurnal lepidoptera—not because of what they take in the way of nectar, but on account of what the female leaves behind her in the way of hungry progeny. This anti-butterfly pose is such good fooling that the gardener who takes it seriously must indeed be void of a sense of humour. Yet were there such a grim foe to the Rhopalocera of our land this magnificent book would be the cure for his enmity. Never before have such complete life-histories of our butterflies been brought together. The work is of course written for the entomologist and not the horticulturist, and one may say that it treats of each species from the egg to the imago, with an extraordinary wealth of detail in describing habits and food plants, markings and structures, many of which can only be seen through powerful microscopes.

The full-page illustrations are as comprehensive as the text. To study the beautiful form and decoration of the eggs alone, as shown highly magnified in these fine coloured illustrations, would not only delight any lover of beautiful objects, but must impress him also with the unending sources of inspiration in Nature's handiwork.

The study of the natural food plants of these beautiful visitors to our

gardens would prove reassuring; for with the exception of the Large and Small Cabbage Whites, which do indeed make windows in cabbage leaves and attack *Tropaeolums*, no butterfly is likely to damage garden plants; nettles, *Cardamine pratensis*, dog violet, plantain, and elm, no one would grudge them. The extraordinary life-history of the rare Large Blue is well told. It is one of the great discoveries of late years, and must be read as a whole to be rightly appreciated. This is a skeleton of the plot. The young larva eats the flowers of wild thyme until its third change of skin. Then it has the power of emitting a sweet liquid which is attractive to certain ants. The first of these that meets it carries it down into the nest, where it passes the rest of its larval life feeding ants with this kind of honey, but feeding itself on the ants' larvæ. Would that an equally beautiful butterfly might be introduced to our gardens whose larvæ would feed on slugs!

"Les Joubarbes (*Semperviva*)."  
(Imprimerie Médicale et Scientifique, Brussels, 1924.) 15 fr.

It is not much short of half a century since Mr. Baker published the last of his notes on the Houseleeks. Now M. Correvon has given us further light on this attractive genus. He has marshalled the species and hybrids into groups with a skill that could only come from a real affection for the plants, and patient work in collecting and noting carried on for many years.

It is nearly impossible to identify closely allied Houseleeks from herbarium specimens, and few men have collected and grown so many forms of this genus as the veteran author of this book. He divides them into two sub-genera according to their having about 12 or no more than 6 floral organs. Those with 10 to 12 sepals, petals, and carpels are the true *Semperviva*. They are broken into two divisions, having either rose-coloured or yellow flowers, and the former is divided into 4 groups and 7 sub-groups according to the characters shown by the leaves.

All who like a rock garden should grow Houseleeks, and all who grow them would derive extra pleasure from them by learning to name them from the pages of this charming little book.

"Sweet Peas: the History, Development and Culture."  
Unwin. 8vo. 197 pp. (Heffer, Cambridge, 1926.) 5s. net.

This book can be recommended to anyone interested in these beautiful and extremely useful flowers. Every chapter of it is full of interest, and all phases of the subject have been dealt with in a very lucid manner. It should please and interest the beginner in the cult of Sweet Peas as well as the oldest growers and writers.

It has been written after very close and intimate observation and association over a series of years, and this, being coupled over the same period with sound practice in raising, growing, and exhibiting, marks it at once as being outstanding.

Many books on horticultural subjects are written by, shall we say, literary people, in which case most of the knowledge is second-hand, but one cannot read even the first chapter of this work without noting the many small items of interest which can only accrue from the pen of an enthusiastic and capable grower and observer. This in itself should be sufficient to recommend it.

The only weak chapter, if we can term it such, is the one on enemies and diseases. This the writer might have enlarged upon somewhat, and dealt with Leather Jackets and Thrips, both of which can be very troublesome.

We might add that the Liver of Sulphur recommended for mildew, though quite efficacious, is at times apt to burn the growing tips if by accident it gets on them (mildew usually only appears on the older and fully developed foliage).

After much experience in dealing with Green Fly (usually on the young growing tips and flower buds) both under glass and in the open, we have found that the plants resent spraying with Nicotine less than any other spraying formulæ that we have so far come across.

"Fruit and the Fruit Trade."  
London, 1926.) 6s. net.

We consider this to be a very well written and interesting publication, and although there are many figures and names it is quite readable and extremely accurate. The only unfavourable criticism we have to make is that some of the varieties are rather out of date, and in the case of Strawberries the variety that is probably grown by 99 per cent. of the growers, namely 'Royal Sovereign,' is not even mentioned.

"Practical Fruit Growing." By J. W. Morton. (Benn Bros., London.) 10s. 6d.

This book deals with most of the branches of fruit culture, but has the air of being written to make one of a series, and would, we think, have profited by delay in publication, and certainly by further editing.

The information given is accurate on the whole, and follows the normal lines, but there are several statements which indicate that the author has not had much experience with the propagation of trees. We read, for instance, on p. 34 that the great drawback in the use of pear stocks is the length of time before the tree bears, the author apparently not knowing that many pears bear just as readily on this stock as upon the quince. The Portugal quince has never been "largely" used as a stock for pears, for the reason that very few pears will take upon it.

The book is, we presume, intended for the market grower, but it has avoided the very important question of ways and means, and will not therefore replace the recent useful publications by Mr. C. H. Hooper and Mr. W. P. Seabrook, which treat fruit growing, as it must, unfortunately, be treated, from the financial side as well as the cultural.

The book is illustrated with a few photographs, which are good, but some of the text figures are quite unworthy.

"Peter Collinson and his Circle of Friends." By Norman G. Brett-James. (The Friends' Bookshop, London.) 15s.

The discovery of North America brought to our British gardens many plants of great value, but it is somewhat curious to reflect on the long period which passed before these introductions were made. In these days, reports such as sent by Captain John Smith from Virginia would have awakened an urgent desire to procure the "Cypres" and "tall Oaks" which he so quaintly describes. It was not until 1740 that the "bullated flower buds" of *Kalmia latifolia* first opened to greet an English May, and many flowers now well known took as long, or longer, to reach these shores. A kindly memory must therefore be cherished for those "curious gardeners" who sent forth collectors of such foreign plants, and among these Peter Collinson, the subject of this memoir, takes an honoured place. By birth a Quaker, a city merchant of some importance, but mostly a gardener, he gave his collector's instinct full sway, and with the aid of Bartram, whom he sent to America, he was able to bring many good American plants to our shores.

Mr. Brett-James has searched widely and well for records of Collinson and his friends, and, besides the recognized sources, has had access to the MS. notes in Miller's Dictionary, now in the hands of Sir John T. Dillwyn Llewelyn (the name is quoted wrongly in the book), and the better-known "Commonplace Books" in the Linnean Society's Library.

A complete list of plants introduced by Collinson is given, and it is interesting to read that the original tree of *Abies canadensis* is still standing in the grounds of Mill Hill School, which occupies the site of his garden, and that this and other relics are now cared for as they should be.

The production of the book is adequate, but the printing is not very good, and a few minor slips will be noted. Some interesting portraits and photographs of Mill Hill houses and landscapes are well reproduced.

All gardeners with a tincture of historical interest will thank the author for his labour of love in gathering this record of Collinson's work.

"Immergrüne Laubgehölze." By Josef Mišák. La. sq. 8vo. 79 pp. (Gartenschönheit, Berlin, 1925.)

This is a well-illustrated description of evergreen trees and shrubs for gardens, dealing with many of the good new introductions (though few of these are illustrated) as well as with the older ones.

Useful lists show plants suited for particular places and types of soil, and the order of flowering of a great number of those mentioned, and a perusal of the volume gives an excellent idea of the great use that could be made of evergreen trees and shrubs for the sole furnishing of a garden if the will were to make such an attempt; and it suggests that such a garden might be a place of no mean beauty if it were designed with care.

"Experiments in Genetics." By C. C. Hurst, Ph.D., F.L.S. xxiv + 578 pp. La. 8vo. (University Press, Cambridge, 1925.) 50s. net.

This is a collection of the papers written by the author between 1897 and 1925, and in a measure illustrates the growth of the science which first received its

name in the Society's Lecture Room in 1906, when Professor Bateson called it "Genetics." Thirty-eight papers are here collected, most of them being reprints from various publications, but not all of them easily accessible.

The subjects dealt with are very numerous, and range over plants, birds, horses, and man, all dealt with from the Mendelian standpoint and mostly experimentally. This is not the place to discuss the various hypotheses the author has from time to time brought forward and tested by genetic observation and experiment, but particular attention may be drawn to the latest, which introduces a novel method of classifying and accounting for the variations seen in that bugbear of the systematist, the genus *Rosa*. If further investigation supports the views, even in a modified form, which the author brings forward, a notable step will have been taken in the direction of reconciliation between the Mendelian and the systematic modes of viewing plant forms. Mendelism will not then be regarded as a last resort of the phylogenetically destitute, but as a tool for the investigation of specific relationships.

"Das Rosenbuch." La. sq. 8vo. 136 pp. By W. Untze and C. Schneider. (Berlin, 1924.)

This volume is the second of a series of books of "garden beauty," and appears to be compiled by some half-dozen different authors. It is copiously illustrated with photographs of roses and rose gardens, and contains eight coloured plates, which (particularly the illustration of 'Mrs. Henry Morse' at the beginning of the book) are rather more pleasing than the coloured plates of roses one commonly sees.

The first quarter of the book is devoted to the origin and history of the rose, the authors taking first the roses of the West, *Centifolia*, Damask, Musk roses and their derivatives, and then the roses of the East, *Rosa indica* and its descendants. This part of the book is illustrated by photographs of the beautiful plates of Redouté, and also by one of 'La France' from the *Floral Magazine* of 1868, an interesting but not very typical picture, and one of 'Maréchal Niel' of 1863.

The next section of the book is devoted to the different types of roses, beginning with the wild roses, which are dismissed in half a dozen pages, after which the authors proceed to garden roses, which they divide into four classes: I, Summer-flowering roses; II, Autumn-flowering roses; III, Climbing roses, and IV, "Garden roses of a wild rose character," by which they mean roses which are single or nearly so, such as 'Irish Fireflame' and 'Red Letter-Day,' the different groups under each class being concisely considered separately. The authors notice with some regret that moss roses have almost ceased to be cultivated in France and England; they would like to see more of them, and suggest that amateurs should take up breeding from them, and that they would find them still grown between Metz and the Côte de Lorraine. There are, however, plenty of moss roses still left in old gardens in England, and particularly in the cottage gardens, where some of the most sweetly scented may often be found, though it is true that they are not often seen at our shows. There is a section on methods of using the rose in garden and park, and another on the rose in art, i.e. in painting and poetry. Two pages are devoted to directions for cultivation, and the volume concludes with lists of roses selected for colour and for various purposes.

"Soil Characteristics: a field and laboratory guide." By P. Emerson. x + 222 pp. 8vo. (McGraw-Hill, London, 1925.) 12s. 6d. net.

An American textbook written to serve as a "guide to the student, the instructor, and the investigator." The four sections of the book deal respectively with the general study of soil, including its mechanical analysis, soil physics, soil fertility, and soil microbiology. Each section gives a general discussion of its subject and outlines methods of study, suggests experiments, and describes apparatus used in investigation. A brief bibliography is given at the end of each section, drawn from American literature. The book should prove a useful laboratory companion to the serious student of soil science.

"Early Explorers in Australia: from the Logbooks and Journals, including the Diary of Allan Cunningham, Botanist, from March 1, 1817, to November 19, 1818." By Ida Lee (Mrs. C. B. Marriott). xii + 651 pp. 8vo. (Methuen, London, 1925.)

The method of this book gives it a somewhat interrupted character, but that, after all, is but natural, for early exploration in Australia is a story at first of brief and sometimes unpremeditated visits of adventurous voyagers into the

unknown. Though it does not purport to be a complete account of the exploration of that great land, yet the author has achieved a notable contribution to its early history.

For gardeners the story of botanical exploration will, of course, have the greatest interest, and the transcription of Allan Cunningham's diary, wherein so much is told of the native flora of the parts he visited just over a hundred years ago, is an extremely valuable part of the book. The manuscripts of this diary are in London, and they are now for the first time made public. The index of species alluded to covers nearly eleven pages of small print in double columns, and this will give some indication of the wealth of knowledge the book reveals.

Not Cunningham's work alone is discussed, but much that was done before his time by many explorers, both British and foreign, comes in for its due share of attention, but from p. 167 to the end, where his death is recorded, Allan Cunningham is the most active agent in the botanical and geographical exploration of this wonderful land.

The book is well printed and well illustrated (often by the reproduction of contemporary drawings), while several maps help one to follow the discoveries made from time to time.

"The Gardener's Assistant." Ed. by William Watson, with a Preface by Prof. Sir F. W. Keeble. Six volumes, 8vo. (Gresham Publishing Co., London, 1925.)

Every old gardener knows and values "Thompson's Gardener's Assistant." It was prepared by that good gardener Robert Thompson, Superintendent of the R.H.S. Gardens at Chiswick, and published in 1859, enlarged by him and republished in 1875, remodelled and revised by William Watson and others in 1900, and now again revised and altered in many ways under the same editor, who, alas! died before his work left the printer's hands. Several new writers were laid under contribution in its preparation, and no pains were spared to bring it up to date, so every present-day gardener will need to know, and knowing will learn to value, this new edition as older generations have those which preceded it.

No branch of horticulture is neglected, nor is the treatment of principles passed over cursorily, for the experience of the Editor taught him that while a man may be a gardener of a sort by following rule-of-thumb methods, no man will ever be a great gardener who does not learn in some way or other the main principles that govern plant growth and apply them to special cases as they arise. The chapters on soils and manures are well and carefully done, and so is the part dealing with the life of a plant, though here, perhaps, too great a knowledge of technical terms is assumed. At any rate, the gardener who sits down and studies these chapters will have acquired a knowledge of the way plants live and multiply that will stand him in good stead when he is confronted with new problems, as all who desire to leave the beaten track must be, and as many of those even who follow it are apt to be.

No more useful present could be given to a young gardener than these six volumes.

"Pecan Growing." By H. P. Stuckey and E. J. Kyle. 8vo. xiii + 233 pp. (Macmillan, New York, 1925.) 12s. 6d. net.

This is a valuable account of the cultural treatment of the Pecan (*Carya Pecan*) and of the varieties to which it has given rise. So far this tree has not shown signs of value as a nut-producing tree in this country, but it is of great value in the South-eastern States of America.

"The Gardeners' Calendar: A Garden Guide for Every Day in the Year." By T. G. W. Henslow, M.A. 8vo. 126 pp. (Dean, London, 1925.) 2s. 6d. net.

One side of each page contains calendrical directions, the other is blank. The notes are brief and clear and generally timely, but it is not necessary to sow parsnip seed in December, nor broad beans in June, and we doubt much whether the author has successfully grown mistletoe by sowing at the time he suggests.

"Photosynthesis: The Assimilation of Carbon by Green Plants." By Prof. Walter Stiles, Sc.D. 8vo. vii + 268 pp. (Longmans, Green, London, 1925.) 16s. net.

The power of fixing carbon is possessed almost solely by green plants and is of cardinal importance in the world. Whether or not the discovery of the precise details of the manner in which carbon is fixed and an exact knowledge of the

mechanism involved and its method of working would enable man to bring about the economical production of sugar from carbonic-acid gas and water is a moot point. But, whether or not, the investigation is worth carrying out, and the present book shows how much still is waiting to be done. The author reviews the work hitherto published very completely, and discusses the results obtained, showing what, in his opinion, has been accomplished and where gaps remain.

This is not the place to discuss the various theories put forward, but rather to recommend the work to every serious student of plant physiology, for it is one that will encourage that feeling of scientific doubt that is so desirable in the would-be investigator, and it is also likely to inspire to intimate investigation of some one among the many problems awaiting solution.

"Les Champignons dans la Nature." By J. Jaccottet. 8vo. 242 pp. (Delachaux & Niestlé, Neuchâtel, 1925.) 30 fr.

The main reason for this book is the series of excellent coloured plates at the end, on each of which one or two fairly common fungi are depicted in their native haunts in natural colours. These are the work of M. Paul Robert fils. The author has described in popular language the species figured and has helped his descriptions as well as the coloured plates by numerous clear figures in the text. He gives an account of the places in which the various species may be found and when they should be looked for, and describes their properties, edible or otherwise.

"The Scent of Flowers and Leaves: its Purpose and Relation to Man." By F. A. Hampton, M.A., B.M. 8vo. vii + 135 pp. (Dulau, London, 1925.) 6s. net.

There have been books upon scented plants for the garden, and there are books upon perfumery, but no book existed bringing together the facts concerning the sense of scent, the chemical substances which that sense appreciates, the value of scents to living things and the like in popular language, lucid and pleasant to read.

There is nothing in the book upon actual cultivation, but there is much that the garden-lover may value in the way of suggestions for planting and so on, for it is doubtful whether anything is more highly prized in the garden than scented flowers and scented leaves.

"Evolution." By J. Graham Kerr. xii + 278 pp.; 2 coloured plates and 53 text-figs. (Macmillan & Co., London, 1926.) 12s. net.

It is a much harder task to write a book on the evolution of living things nowadays than it was, say, twenty-five years ago. The coming of Mendelism, the development of cytology and of experimental biology in general, and the progress of palæontology, have given a new aspect to many old problems and have revealed unsuspected complexities beneath apparent simplicity. Professor Graham Kerr is especially well fitted for the task of exposition, and his lucid and well-balanced survey of the subject is of more than usual interest. There is, however, one very important reservation to be made. The author confines his attention strictly to the animal kingdom, and does so for a very singular reason. He states that "the animal and the plant kingdoms diverged from one another at a very remote evolutionary period," which most people will admit to be true; but he goes on, "and I believe that some of their most striking resemblances, such, for example, as the phenomena of mitosis and of fertilization, have been developed by them quite independently." This is a very bold speculation, and, as it seems to us, a very hazardous one. If resemblances so far-reaching and so detailed are not evidence for community of descent the whole fabric of the evolution theory will need underpinning.

It would be of much interest if the author would develop his views on this subject and discuss their implications in greater detail.

Professor Graham Kerr begins his preface "This is a book for beginners," but many who are no longer beginners may profit from it. The botanist, for example, who wishes to appreciate the zoological aspects of evolution will hardly find a better book. A word of praise is due to the excellence of the illustrations, more particularly of the two coloured plates of mimetic butterflies.

## NOTES AND ABSTRACTS.

[For Index of Periodicals quoted see previous volumes.]

**Apple Scab and *Venturia inaequalis* (Cke.) Wint.** By C. N. Frey and G. W. Keitt (*Jour. Agr. Res.*, vol. xxx. No. 6, March 1925, pp. 529-540).—The following is a summary of the results obtained by the authors.

Preliminary experiments were made to determine the spore content of the air of orchards by means of an electrical device. By wetting leaves freshly collected from the orchard it was shown that asci were capable of discharging under favourable conditions on May 7. Dry weather intervening, the natural discharge was delayed until May 19. Heavy discharges occurred between May 19 and June 7.

The maximum concentration of ascospores of *Venturia inaequalis* was noted on May 21; the average catch for 8½ hours was one ascospore to 0.4 litre of air. The wind velocity varied from fourteen to twenty-three miles per hour. It was found that a good supply of moisture was the most important requisite for the discharge of the spores. Conidia were only found during rain periods, and are readily detached from the conidiophores during such conditions. Most of the leaf infection occurs during May and June; fruit infection from June 8 to August 24.

Leaf inoculation experiments were conducted upon branches enclosed in moist chambers. Old leaves were found to be more resistant to infection by *Venturia inaequalis*.—A. B.

**Carotin, Chemical and Physical properties of.** By F. M. Schertz (*Jour. Agr. Res.*, vol. xxx. No. 5, March 1925, pp. 469-474).—Carotin, the valuable pigment in carrots, is present in small quantities (1.68 to 3.46 grams per bushel, say fifty pounds of fresh carrots), but much of this is lost in the extraction owing to oxidation, and the ultimate yield is seldom more than 1.13 gram pure carotin with a melting-point of 174°.

Solutions of carotin in absolute alcohol or petroleum ether are quite stable when kept cool, while crystals of carotin can be easily stored in alcohol or petroleum ether with little oxidation.—A. B.

**Decomposition of Proteids and Amino-Acids by micro-organisms.** By S. A. Waksman and S. Lomanitz (*Jour. Agr. Res.*, vol. xxx. No. 3, Feb. 1925, pp. 263-282).—The nature of the decomposition by two fungi and bacteria was found by the authors, using pure amino-acids and casein as sources of pure nitrogen, and nitrogen and carbon respectively. The reactions taking place were followed by measuring the residual amino-nitrogen formed by the decomposition of the casein, the formation of ammonia, the amount of growth, and the disappearance of dextrose in the medium.

The results showed that all organisms do not attack proteins and amino-acids alike. *Trichoderma Koningi* and *Zygorhynchus molleii* use the various amino-acids and proteins both as sources of nitrogen and carbon, the amount of growth and ammonia accumulation depending upon the available carbon in the amino-acid molecule. A definite relation exists between the carbon (available) content of the amino-acid molecule and the amount of ammonia accumulating.

Two bacteria (*Bacterium cereus* and *B. fluorescens*) behaved differently. The first was unable to attack glycocoll, alanine, and phenyl-alanine, while glutamic and asparagine were acted on only to a limited extent. Casein and native proteids were decomposed very rapidly. *B. fluorescens* was unable to decompose casein, but acted on the other amino-acids very readily. By combining the two organisms in casein media, the protein decomposed rapidly into ammonia, *B. cereus* hydrolyzing the casein chiefly to protein derivatives, and *B. fluorescens* decomposing the latter to ammonia.



The actinomyces was found to be capable of utilizing the amino-acids and proteins as sources of energy, thus allowing an accumulation of ammonia, even in presence of dextrose.

A short bibliography is appended.—*A. B.*

**Fertilization of *Ophrys speculum*, *O. lutea* and *O. fusca*.** By Colonel M. J. Godfery, F.L.S. (*Jour. Bot.*, Feb. 1925).—A very interesting and well written account is given of the observations of M. Pouyanne, Conseiller à la Cour d'Appel, Alger, on the pollination of these three natives of N. Africa. Towards the end of the papers, Colonel Godfery recounts some of his own valuable observations of *O. fusca* in the garden of the Hôtel Continental at Hyères.

After twenty years' observation, M. Pouyanne has come to the conclusion that *O. speculum* is visited by one insect only, *Dieilis ciliata* F. (*Copla aurca*), a bee, and only by the male insect at that. The reason suggested is that the flower of *O. speculum* bears some resemblance to the female *Dieilis*. Numerous and interesting experiments performed by M. Pouyanne seem to bear this out. In the same way he brings evidence forward to show that *O. lutea* is visited by the males of two species of *Andrena* (*A. nigro-olivacea* Dours and *A. senecionis*) which place themselves upside down on the labellum and after one or two minutes leave the flowers with the pollinia attached to the upper part of the extremity of the abdomen. The markings on the lip of this flower in M. Pouyanne's opinion represent a queen bee at rest on a broad yellow flower, head outwards, and the male accordingly faces the same way.

*O. fusca* is pollinated by the males of *Andraena trimmerana* Kirby and *A. nigroaena* var. *nigrosericea* Dours, which remove the pollinia attached to the tail.—*W. J. D.*

**Fruit, Sulphur-dioxide as a Preservative for.** By B. T. P. Barker and O. Grove (*Jour. Pom. & Hort. Sci.* 5, pp. 50-60; Dec. 1925).—It is shown that solutions of 0.08 per cent. to 0.1 per cent. of sulphur-dioxide will preserve fruit if it be placed in sealed air-tight jars, so that apples, plums, raspberries, loganberries, blackberries, strawberries and oranges may be kept for some months and subsequently used for cooking or jam-making. In currants and gooseberries the skin hardened, and this hardening did not entirely disappear when the fruit was stewed or converted into jam. The preservative is almost entirely driven off in cooking. A temporary loss of colour occurs in fruit so preserved, and there is some (progressive) loss of setting power in jam-making from such fruit, but as a method of preservation it is cheaper and as generally satisfactory in other ways as the ordinary method of bottling fruit.—*F. J. C.*

**Fruit Trees, Experiments on Manuring.** By T. Wallace (*Jour. Pom. & Hort. Sci.* 5, pp. 1-33; Dec. 1925).—Experiments are described demonstrating the characteristic effects of deficiency of nitrogen, potassium, phosphorus, calcium, magnesium and sulphur upon various fruit trees and bushes. The author considers that the ratio of nitrogen to potassium and the ratio of potassium to magnesium are important points in the soil for fruit trees.—*F. J. C.*

**Fusaria, Development of pigment in, and the Hydrogen-ion Concentration.** By C. P. Sideris (*Jour. Agr. Res.*, vol. xxx. No. 11, June 1925, pp. 1011-1026; 1 plate).—The development of pigment by *Fusaria* is mainly controlled by the hydrogen-ion concentration of the culture media. Pigment is produced practically by all the different species in dextrose solutions at hydrogen-ion concentrations between  $P_{H3.5}$  and  $P_{H5.5}$ , where the initial  $P_H$  value was maintained constant by the additions of adjusting reagents. In cultures, however, whose hydrogen-ion concentration was not maintained constant, pigment was produced at  $P_{H3.0}$ , 4.0, 5.0, 6.0, 7.0, and 7.5.

The pigment appears of two kinds, diffusible and non-diffusible. The colour depends upon the hydrogen-ion concentration of the surrounding culture solution. The movement of the hydrogen-ions and the hydroxyl-ions through the solid culture media is slight.—*A. B.*

**Fusaria-resistant Cabbage.** By L. R. Jones, J. C. Walker, and John Monteith, jun. (*Jour. Agr. Res.*, vol. xxx. No. 11, June 1925, pp. 1027-1034; 2 plates).—The authors record the progress of the investigations with early varieties of cabbage which show some degree of resistance to the *Fusarium* fungus. The varieties 'All Head Early' and 'Glory of Copenhagen' have been found to be markedly resistant, and it is hoped that these new strains will be placed on the market.—*A. B.*

**Geranium and Pythium de Baryanum.** By H. Braun (*Jour. Agr. Res.*, vol. xxx. No. 11, June 1925, pp. 1043-1062; 6 plates).—Stem rots of *Pelargonium* cuttings caused by *Pythium de Baryanum*; *P. de Baryanum* var. *Pelargonii* nov. var., and *P. splendens* nov. sp., are described, and the comparative morphology and physiology of these organisms is detailed. The signs of the disease consist of a blackening and shrivelling, starting at the cut end and spreading throughout the cutting. Cultural characteristics on sixteen media are described.

*P. de Baryanum* var. *Pelargonii* is characterized by the lowest minimum temperature, a character sufficiently constant to identify it experimentally within twenty-four hours. *P. splendens* shows the most luxuriant growth of the three fungi at 20° to 35.5° C.

*P. de Baryanum* shows the highest viability on media, and was readily revived after eleven and a half months at 16° C. *P. de Baryanum* var. *Pelargonii* has very large conidia and relatively few oospores.

A short bibliography is appended.—A. B.

**Grape Vine Root Rot (*Clitocybe tabescens* (Scop) Bres.).** By Arthur S. Rhoads (*Jour. Agr. Res.*, vol. xxx. No. 4, Feb. 1925, pp. 341-364; 6 plates).—A mushroom root rot of grape vines is often met with in Missouri, U.S.A. The organism isolated from the roots of diseased vines proved to be a slow-growing but distinctive one, developing submerged rhizomorphs in the cultures. The fungus is a species of *Clitocybe*, closely related to *C. tabescens*.

This disease is associated with lands formerly covered with oak, and is unknown in prairie soils and old lands. It appears on poorly drained land. The present writer shows that the fungus can attack fruit, forest and shade trees. He was able to isolate this fungus from the roots of vines and to show that *C. tabescens* was the causal organism, not *Armillaria mellea* as was generally believed.—A. B.

**Phytophthora infestans, the overwintering of.** By H. L. G. de Bruyn (*Phytopath.*, 16, pp. 121-140; Feb. 1926; figs.).—The means by which the fungus of potato disease is carried over from one season to the next has always been a moot question, although de Bary's theory of a hibernating mycelium for long held the field alone. Evidence is now produced that the fungus can grow upon a much wider range of food materials than was at one time supposed, and may indeed persist for long in the soil, especially if that contain much decaying vegetable matter. It will grow more readily upon dead, strawy material than upon dead potato stems, and may persist over winter in the field by this means. It is also shown that in certain stages the fungus can withstand great degrees of cold, especially if it be dry.—F. J. C.

**Potato Mutations.** By R. N. Salaman (*Jour. Genetics*, 15, pp. 267-300; plates; July 1925).—Mutations discovered by Mr. McKelvie in the potato 'Arran Comrade' are considered. These mutations are characterized by increasingly greater losses of pigment in the tuber, and until the loss of [anthocyanin] pigment is practically complete the characters of the plant do not vary in other ways from those of the original. When the loss of colour is complete a change takes place in the haulm, which is shorter, and in the tuber, which is more kidney-shaped. The germ cells participate in these changes, for the offspring from the different mutations shows differences in the proportion of pigmented plants. The author considers there is some evidence of lowering of heritable cropping capacity in the least pigmented form, but the mutants show no difference in susceptibility towards the various potato diseases.—F. J. C.

**Self-sterility and Cross-Incompatibility in Plums and Cherries.** By M. B. Crane (*Jour. Genetics*, 15, pp. 301-322; plates; July 1925).—The general need for cross-pollination of fruit flowers is now recognized, and the author in this paper shows that the cherries experimented with, mentioned below, are almost entirely self-sterile and are divisible into three groups, the varieties in each group being incapable of fertilizing each other, but capable of fertilizing any variety in either of the other groups. The groups are as follows:—Group I.: Early Rivers, Bedford Prolific, Knight's Early Black, Black Tartarian "A," Black Tartarian "B," Black Eagle. Group II.: Bigarreau de Schrecken, Big. Frogmore, Guigne de Winkler. Group III.: Emperor Francis, Big. Napoleon. In plums, Coe's Golden Drop, Coe's Violet, Crimson Drop, Jefferson, and Allgrove's Superb do not intercross, nor do President and Late Orange. Some others appear to be more or less incompatible, but the fact is not so clearly marked with

them as with those the names of which are given. It is considered that the incompatibility is not the result of slow growth of pollen tubes, but of some more definite bar to fertilization. It is pointed out also that while in many crosses the ovule commences development, and development may in fact proceed a considerable way, yet seeds are frequently lacking, just as they are in certain apples.

A valuable list of self-fertile, partially self-fertile, and self-sterile varieties of cherries and plums, as shown by experiments at the John Innes Institution, is given, which we reproduce below as it is of considerable importance.

## CHERRIES.

<i>Self-sterile.</i>	<i>Partially self-fertile.</i>	<i>Self-fertile.</i>
Amber Heart (Kentish Big.)	Archduke	Flemish Red
Bedford Prolific	Empress Eugénie	Kentish Red "A"
Belle d'Orleans	May Duke	Late Duke
" de St. Tronc	Royal Duke	Morello
Bigarreau Frogmore		Wye Morello
" Jaboulay		
" Late Black		
" Napoleon		
" Noir de Guben		
" " de Schmidt		
Black Eagle		
" Heart		
" Tartarian "A"		
" " "B"		
" " "E"		
Bohemian Black		
Early Rivers		
Elton		
Emperor Francis		
Florence		
Géante d'Hedelfingen		
Governor Wood		
Guigne d'Annonay		
" de Winkler		
Kentish Red		
Knight's Early Black		
Montreuse de Mezel		
Noble		
Toussaint (?)		
Turkey Heart		

## PLUMS.

<i>Self-sterile.</i>	<i>Partially self-fertile.</i>	<i>Self-fertile.</i>
Allgrove's Superb	Belgian Purple	Belle de Louvain
Bryanstone Gage	Blue Rock	Czar
Coe's Golden Drop	Cambridge Gage	Denniston Superb
" Violet	Cox's Emperor	Early Transparent
Comte d'Althan	Early Favourite	" Mirabelle
Crimson Drop	" Orleans	Farleigh Damson
Early Green Gage	Frogmore Damson	Gisborne's
Jefferson	Prince Engelbert	Golden Transparent
Kirke's Blue	Reine Claude Violet	Goliath
Late Orange	Rivers' Early Prolific	Guthrie's Late
" Orleans (Frogmore Orleans)		King of the Damsons
McLaughlin's Gage		Monarch
Old Green Gage		Myrobalan Red
Pond's Seedling		Oullin's Golden Gage
President		Pershire
Prune d'Agen		Prince of Wales
Transparent Gage		Prune Géante
Wyedale		Reine Claude Bavay
Yellow Magnum Bonum		Victoria
		White Magnum Bonum

F. J. C.

**Soil Mulch and Moisture.** By M. A. McCall (*Jour. Agr. Res.*, vol. xxx. No. 9, May 1925, pp. 819-832).—Soil mulch has an inhibitory effect on moisture absorption when little rain falls. It inhibits absorption by increasing the amount of evaporation in the newly fallen moisture. The volume weight of the stirred mulch being less than that of an equal depth of unstirred soil, the moisture content of the mulched soil after rain is higher on a percentage basis. When conditions favour evaporation, the result is a greater loss from the mulched soil.

The soil mulch prevents the loss of moisture already in the soil by checking evaporation.

The practical use of the soil mulch is dependent on climatic conditions, which influence the prominence of either the inhibitory effect on absorption or the positive effect on retention, or it may nullify either or both.—*A. B.*

# EXTRACTS FROM THE PROCEEDINGS

## OF THE

### ROYAL HORTICULTURAL SOCIETY.

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#### GENERAL MEETING.

JANUARY 13, 1925.

The Rt. Hon. The Lord LAMBOURNE, P.C., V.M.H., in the Chair.

One hundred and forty-four Fellows and six Associates were elected, and four Societies affiliated.

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#### GENERAL MEETING.

JANUARY 27, 1925.

Mr. W. A. BILNEY, V.M.H., in the Chair.

One hundred and thirteen Fellows and four Associates were elected, and five Societies affiliated.

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#### ANNUAL GENERAL MEETING.

FEBRUARY 10, 1925.

The Rt. Hon. The Lord LAMBOURNE, P.C., V.M.H., President, in the Chair.

The Minutes of the previous Meeting were read and signed.

One hundred and seventy-seven Fellows and four Associates were elected, and four Societies affiliated.

The President then moved the adoption of the Annual Report. He pointed out that the Society was about to try the experiment of keeping Chelsea open for five days, and explained the position of the proposed new Hall. He then expressed the thanks of the Society to the retiring Members of the Council and called on the Treasurer to make his financial statement.

The Treasurer drew attention to certain points in the annual accounts, and seconded the adoption of the Report. This was supported by Mr. W. Cuthbertson, who spoke on Wisley and on the reorganization of its staff.

The following names for President, Vice-Presidents, Treasurer, Members of the Council, Secretary and Auditor, having been duly proposed and seconded, and the list circulated to Fellows in accordance with Byelaw 74, and no other names having been proposed, these gentlemen were declared by the President to be duly elected.

*As President.*  
The Rt. Hon. The Lord Lam-  
bourne, P.C., C.V.O., V.M.H.

*As Treasurer.*  
Sir William Lawrence, Bt.

*Proposed by*  
Sir William Law-  
rence, Bt.

Mr. W. Cuthbert-  
son.

*Seconded by*  
Mr. W. A. Bilney.

Mr. Geo. Monro.

## ii PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

*As Secretary.*  
Mr. W. R. Dykes, M.A., L.-ès-L.

*As Members of the Council.*  
Lt.-Col. Stephenson R. Clarke, C.B.  
Mr. T. Hay.

Mr. G. W. Leak.

*As Vice-Presidents.*  
The Duke of Bedford, K.G., F.R.S.  
The Duke of Portland, K.G., P.C.,  
C.G.V.O.  
The Hon. Vicary Gibbs, V.M.H.  
Sir George Holford, K.C.V.O.,  
C.I.E.  
Sir James Knott, Bt.  
Sir John T. D. Llewelyn, Bt., D.L.,  
J.P., F.L.S., V.M.H.  
Sir Daniel Morris, K.C.M.G., J.P.,  
D.Sc., D.C.L., F.L.S., V.M.H.  
Lt.-Col. Sir David Prain, C.M.G.,  
F.R.S., V.M.H.  
Viscount Ullswater, P.C.  
Mr. J. C. Williams.

*As Auditor.*  
Mr. Alfred C. Harper.

*Proposed by*  
Mr. C. G. A. Nix.

*Seconded by*  
Mr. H. B. May.

Mr. C. G. A. Nix. Mr. G. W. E. Loder.  
The Rt. Hon. The Sir William Law-  
Lord Lambourne. rence, Bt.  
Mr. W. Cuthbertson. Mr. E. A. Bowles.

The Rt. Hon. The Sir William Law-  
Lord Lambourne. rence, Bt.

Mr. C. T. Musgrave. Mr. C. G. A. Nix.

Victoria Medals of Honour were presented by the President to Mr. H. J. Jones, Mr. G. F. Moore, Professor W. Wright Smith and Mr. G. Yeld; and the Lawrence Medal was received by Mr. E. Beckett on behalf of the Hon. Vicary Gibbs.

Veitch Memorial Medals were presented to Mr. John Hoog, Miss Snelling, and Mr. W. R. Dykes, the Cory Cup to Lt.-Col. L. C. R. Messel, and the Sander Medal to Mr. G. F. Moore.

The Meeting closed with a vote of thanks to the President, proposed by Mr. R. W. Wallace. In acknowledging it the President referred sympathetically to the Society's loss by the death of its late President, Field-Marshal the Lord Grenfell.

## REPORT OF THE COUNCIL FOR THE YEAR 1924.

1. **The Year 1924.**—During the past year the work of the Society has progressed steadily and the number of its Fellows has continued to increase.

2. **The New Hall.**—The chief anxiety of the Council is to provide adequate space for the exhibits which exhibitors wish to put before the Society at successive Fortnightly Shows, for the ever increasing public which comes to these Shows, and for the administrative work of the Society, which is increasing as its members grow. A suitable site for a new hall has been found, and its possibilities are now being carefully examined in order that the best possible use may be made of the site and the Society provided with an adequate home.

3. **Extension of the Chelsea Show.**—It has more than once been suggested that Chelsea should remain open to visitors for more than three days and that it is desirable that exhibits which have been prepared with such care and skill should not be dismantled after so short a time as three days. The experiment is, therefore, to be tried in 1925 of holding the Chelsea Show from Tuesday, May 19, until Saturday, May 23, and it is hoped that this new departure will enable visitors to examine the exhibits more carefully and reduce the crowding at any one time. The relaxation of the regulations with regard to the Entertainments Tax enabled the Council to provide a band in 1924 in the adjacent Ranelagh Garden. The experiment was so popular that it is hoped that it will be possible to continue it.

4. **The Autumn Show at Holland Park.**—The separation of the Fruit and Vegetable Show from the Autumn Show at Holland Park was much appreciated by exhibitors, and seemed to be successful in every way. The extra space which it allowed for flowers at Holland Park was adequately filled, and it was generally agreed that seldom has a better show of Autumn roses been seen, and the same criticism might well have been made of the other flowers exhibited.

5. **Fruit and Vegetable Shows.**—The applications for space at the Fruit and Vegetable Show were so heavy that the Council has decided to separate these two Shows in 1925 and to hold a Vegetable Show in conjunction with the Fortnightly Meeting on September 8 and 9, and a separate Show for Fruit on September 29 and 30.

6. **Amateur Show.**—The Council has also decided to try the experiment of holding a show exclusively for amateurs on June 30 and July 1. It is felt that amateurs often hesitate to make small exhibits when they would be surrounded by the large trade groups, but it is hoped that on this occasion they will not hesitate to show the best produce of their gardens. The special schedule may be obtained on application to the Secretary at Vincent Square.

7. **The Society's Publications.**—Great efforts have been made, and will continue to be made, to bring the publication of the *Botanical Magazine* up to date. If it is realized that, when the Society undertook the publication, there was no reserve of drawings or material on which to rely when living specimens of new plants were not available, it will be seen that some delay was almost unavoidable. Now, however, a reserve has been accumulated, and it is hoped that before the close of 1925 the magazine will be appearing once more at regular quarterly intervals.

The vast amount of work involved in the preparation of Pritzel's "*Index Iconum Botanicarum*" is now more than half completed. Some 175,000 references to botanical illustrations have been typed out, checked and sorted, and it is anticipated that the 125,000 which still remain will be completed in 1926.

During the past year the lectures which are available for circulation among affiliated societies have been overhauled and brought up to date, and several entirely new lectures have been added to the list, which may be obtained on application to the Secretary.

The Society's "*Book of Rules for Judging*" has also been reprinted, and all secretaries of local societies are advised to obtain a copy. The volume embodies

#### iv PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

the experience of many years in dealing with difficulties which arise when show schedules are loosely worded, and contains much advice which should be valuable to those who manage shows and draw up their schedules.

**8. Mrs. Edward Harding's Pæony Cups.**—Three cups have been given to the Society by the well-known American amateur, Mrs. Edward Harding, to encourage the cultivation of Pæonies by amateurs in this country. They are to be offered for award in three successive years. In 1924 the competition was so disappointing that the cup was withheld. It is hoped, however, that there will be a better show of Pæonies this year, for Pæonies need relatively little attention, are not fastidious as to soil, and do best when left undisturbed for several years. They are therefore worthy of a place in every garden.

**9. The Clay Cup for Scented Roses.**—The entries for this Cup in 1924 were unusually numerous and the competition close. In the end the Cup was awarded to 'Bedford Crimson,' shown by Messrs. Laxton Bros. The fact that this rose, besides winning the Cup for its exquisite scent, also received an award at the Society's Rose Trials at Wisley, gives promise that the variety will become a garden favourite.

**10. Weekly Broadcast Bulletin.**—During the past year the Council undertook that the British Broadcasting Company should be supplied with a weekly bulletin on work to be done in the garden. These reports have apparently been much appreciated, and at the request of gardeners in the North an attempt is to be made in the current year to supply from Wisley a second weekly bulletin specially adapted to the state of vegetation in the Midlands and North of England.

**11. Lindley Library.**—During the course of the year seventy-one volumes have been purchased and added to the Library, which now remains open until the time of the closing of the shows instead of closing at 5 p.m. throughout the year.

The Society is much indebted to Mr. Alfred Dawkins, who has presented the original manuscript of Veitch's "Manual of Coniferae" by Adolphus Kent.

A large number of foreign serials, which it was impossible to obtain during the war, have now been procured and the sets made complete.

The work of preparing a new Library Catalogue has made considerable progress, and it is hoped that it will be ready for printing during 1925.

**12. Obituary.**—Both horticulture and the Society are the poorer by the death of Sir Harry Veitch, who will long be remembered as the introducer into our gardens of many fine plants and as a most generous supporter of horticultural charities. From 1887 to 1919 he was a Member of the Council of the Society and then became a Vice-President. He was one of those Fellows to whom the Society owed its reorganization, and who helped to launch it on its successful course.

We also mourn the loss of Mr. Sydney Morris, whose name was added only last year to the list of holders of the Victoria Medal of Honour in recognition of the work that he did in raising new varieties of Montbretia; and of Mr. Irwin Lynch, whose reputation as a skilful gardener and grower of rare plants was based on his good work for many years as Curator of the Cambridge Botanic Garden.

Other well-known Fellows who have died during the past year include General Sir Dighton Probyn, Mr. Pantia Ralli, the owner of a famous collection of Orchids, Mr. Morgan Veitch, Mr. Anthony Waterer, so well known as a grower and raiser of Rhododendrons and of other shrubs and trees, and Mr. Reginald Malby, one of the foremost plant photographers and a familiar figure at the Society's shows.

**13. The Veitch Memorial Trust.**—Veitch Memorial Medals, which are given to those who have helped the advancement and improvement of the science and practice of horticulture, have been awarded in gold to Monsieur H. Correvon for his work on Alpines, and to Mr. John Hoog of the firm of C. G. van Tubergen, jun., of Haarlem, for his work in introducing into cultivation many good garden plants. The medal in silver and a prize of £50 have been awarded to Mr. W. R. Dykes for his monograph 'The Genus Iris,' and the medal in silver and a prize of £25 to Miss Snelling for her botanical illustrations. A Silver Medal and a prize of £5 and a Bronze Medal and £2 10s. have been offered for award at the Edinburgh International Show in 1925.

**14. The Loder Rhododendron Cup.**—The Loder Rhododendron Cup has been awarded to Professor C. S. Sargent, the well-known Director of the Arnold



Arboretum in Massachusetts, U.S.A., in recognition of the work that he has done for many years in spreading a knowledge of Rhododendrons.

**15. The Cory Cup and Sander Medal.**—The Cory Cup, which is awarded for the best hardy plant of garden origin shown to the Society in the course of the year, has been awarded to Lieut.-Colonel L. C. R. Messel, O.B.E., of Nymans, Handcross, Sussex, for raising *Eucryphia* 'Nymansay.' This shrub obtained an Award of Merit on August 26, 1924.

The Sander Medal, which is awarded annually for the best greenhouse novelty of the year, has been awarded to Mr. G. F. Moore, of Chardwar, Bourton-on-the-Water, for raising *Cypripedium* 'Doris Stanton.'

**16. Victoria Medal of Honour.**—Vacancies in the list of holders of the V.M.H., caused by the deaths of Dr. W. B. Hemsley, Mr. Sydney Morris, Mr. James Sweet, and Sir Harry Veitch, have been filled by the election of Mr. H. J. Jones, Mr. G. F. Moore, Professor W. W. Smith, and Mr. G. Yeld.

**17. Lawrence Medal.**—The Lawrence Medal has been awarded to the Hon. Vicary Gibbs, V.M.H., for his exhibit of Vegetables at the Holland Park Show.

#### 18. Increase in Membership.—

LOSS BY DEATH IN 1924.					FELLOWS ELECTED IN 1924.				
Life Fellows	..	..	..	10	Life Fellows	..	..	..	37
4 Guineas	..	..	..	1	4 Guineas	..	..	..	13
2 „	..	..	..	120	2 „	..	..	..	1,434
1 „	..	..	..	109	1 „	..	..	..	1,070
				<hr/> 240	Associates	..	..	..	80
				<hr/>	Affiliated Societies	..	..	..	60
LOSS BY RESIGNATION, ETC.									
4 Guineas	..	..	..	4					2,694
2 „	..	..	..	349	Deaths and Resignations	..	1,114		
1 „	..	..	..	448					
Associates	..	..	..	36	NUMERICAL INCREASE	..	1,580		
Affiliated Societies	..	..	..	37					
				<hr/> 874	Total on November 18, 1923			19,187	
Total Loss	..	..	..	1,114	Total on November 18, 1924			20,767	

**19. Committees.**—The Council wishes to express its gratitude to those Fellows of the Society who have served on one or other of its Committees and whose work has become more onerous with the increasing activities of the Society.

The Council also desires to thank the Press for the way in which the work of the Society has been brought to the notice of the public.

#### WISLEY REPORT.

In common with other parts of South-east England, Wisley has had considerably more than the average rainfall, distributed, however, over a part of the year which is normally dry, and garden plants have therefore benefited rather than suffered. In most parts the drainage is too good to allow the soil to become too wet. Herbaceous plants continued longer in beauty, and shrubs and trees made more than the usual amount of growth, while the amount of fruit on most of the shrubs grown for their berries, especially the Barberries, Cotoneasters and Pyracanthas, has never been exceeded. The winter of 1923-24 was trying enough to test to some extent the hardiness of some of the newer Chinese plants, and with one or two small exceptions none suffered.

**20. Rose-trial Garden.**—The new Rose-trial Garden was open for the inspection of Fellows for the first time in 1924, and considerable numbers availed themselves of the opportunity of seeing the newer roses growing and of judging for themselves their garden value. A Special Committee was appointed to judge the garden value of the roses grown and they have recently issued their report. The Council wishing especially to mark the distinction between an award made to roses at an exhibition where the ordinary Award of Merit may be granted, and

that made as a result of trial in the garden, has instituted a new award called "The Wisley Rose Award," and the first awards have been granted. A considerable number of new varieties have again been added this winter. The Rose-trial Garden is about half a mile from the main entrance towards Byfleet. Near it are planted many rose species and some of the older varieties.

21. **Fruit-testing Station.**—It is expected that during the coming year sufficient progress will be made to enable some of the fruits under trial to be distributed to the sub-stations which are to be established under this scheme in connection with the Ministry of Agriculture. A considerable number of apples, some pears and plums, many raspberries and currants, and some gooseberries are already planted. It may be of interest to Fellows to know that the collection of fruit trees for study at Wisley now includes 332 varieties of apples, 143 of pears, 122 of plums and damsons, 10 of cherries, about 180 of gooseberries, 38 of red, 32 of black, and 4 of white currants, 138 of raspberries, and 6 of other berries, 6 of quinces, 40 of grapes, 14 of peaches and nectarines, and many figs. The new fruit-testing ground is near the rose garden, and is now, with the nursery grounds attached, open to the inspection of Fellows.

22. **Floral and Vegetable Trials.**—Since the number of kinds of vegetables under trial each year has been reduced, it has been possible to give more systematic attention to each in its turn, and as time passes it will be possible to develop a classification of each, showing the differences between varieties offered, those which are too much alike, and so on. The same is being done with flowers, and consultation of the Reports of these trials as they appear in the JOURNAL would greatly assist Fellows in their choice of varieties to grow. The trials shown in the calendar for 1924, both of flowers and vegetables, have been carried out, except that those of Delphiniums and Hardy Pinks are to be continued into 1925 and that the annual Delphiniums as pot plants, of which a trial had been proposed, proved unsuitable subjects for this type of gardening. The trials of annuals in pots for flowering in a cool or cold greenhouse in spring which have been carried out have proved exceedingly attractive and an object-lesson upon the possibilities of these plants for cold greenhouses. They include, so far, Stocks, Mignonettes, Antirrhinums, Salpiglossis, Schizanthus. The plant-house now contains Carnations selected from recent trials for their good winter-flowering qualities. Arrangements have been concluded with the Iris Society for joint action in testing the garden value of Irises, and planting is to commence in the spring.

23. **The Garden.**—Progress has been made with all the work referred to in the last Report, and in addition some new paths have been constructed. Work is in progress on the new gate entrance, designed by Mr. E. White, to be erected in memory of the late Secretary, the Rev. W. Wilks, and upon the road front of the Laboratory many plants suitable for walls have been planted; the heath and shrub gardens have been extended. Proposals for the rearrangement of the land in front of the Laboratory have been considered, but are for the time being deferred. Many of the new shrubs raised from seed collected by Farrer and Forrest have developed into fine plants, and several are likely to take their place in the forefront of flowering shrubs; notes concerning these and other outstanding and uncommon plants are appearing in the JOURNAL. Land is being purchased for the planting of a shelter belt for Seven Acres and the rock garden.

24. **Experimental Work.**—Further work on green manuring and on the comparative composition of certain potatoes and beans is being done by Dr. Darbishire; the life-histories of various garden pests, including a beetle injurious to Saxifragas, a mite suspected of damaging Strawberries, Phlox eelworm, leaf-miners, are being investigated by Mr. G. F. Wilson; Mr. Dowson is investigating a Sclerotinia disease of Antirrhinums and Stem-rot of Carnations, together with some other diseases; Mr. Buxton has continued his work on bud development, and Mr. Rawes experiments on pollination and summer pruning of fruit trees. Reports have been published in our JOURNAL on *Thereva plebeia*, an insect which attacks Cabbages, the eelworm disease of Phlox, a peculiar mildew of Sweet Peas, and nettlehead of Black Currants.

An investigation of available grease-banding materials was carried out during the winters of 1922-24, and a report dealing with the whole question of grease banding has been published. A trial of spraying machines was also carried out during the year, and awards were made by the Council as a result of this trial. Numerous reports and notes on various garden plants have been prepared and published in our JOURNAL.

25. **Chelsea Show.**—Following the custom of recent years an exhibit illustrating some of the experimental work done at Wisley was set up at Chelsea, and arrangements were made to answer inquiries of visitors relating to gardening matters. Large numbers of inquiries were dealt with.

26. **Wembley.**—An exhibit illustrating one portion of the investigations carried out at Wisley, that upon pollination in orchards, was made in the British Government Pavilion at Wembley, and attracted a good deal of attention and approbation.

27. **Broadcasting.**—Weekly diaries of garden work have been prepared at Wisley and have been broadcast by the British Broadcasting Company, and this has brought a large amount of correspondence and assisted us to disseminate horticultural information to a larger public than hitherto. In 1925, in addition to the General Bulletin, a special one prepared with the assistance of some Northern Fellows will be broadcast in the North of England.

28. **Other Work at Wisley.**—The number of inquiries received during the past year has greatly increased, and with them correspondence in general; distribution of plants has also been much greater than in previous years, and the list of plants and seeds available in 1925 will be found to include, in addition to many well-tried plants, a number of the newer acquisitions from China; the practical examinations connected with the Teachers' Horticultural Certificate in Honours and the National Diploma in Horticulture were carried out at Wisley; the list of awards to plants made by the Society from 1910 to 1923 has been compiled, and will be ready for sale early in the new year. A large exhibit of Gooseberry varieties was made at Vincent Square during the summer.

29. **Visitors.**—The number of visitors to Wisley increases annually with the increase in Fellowship and the facilities for reaching the garden, and a particularly pleasing feature is the increase in the number of parties of professional gardeners and of people visiting in search of special information. The omnibus service, Kingston and Guildford (No. 115 G.O.C.), is being freely used by visitors. One hundred members of the Imperial Botanical Conference visited the gardens in July.

30. **School of Horticulture.**—The number of applicants for places in the School of Horticulture considerably exceeds the vacancies that arise, and the School remains full. Twelve students completed their two years' course during the year.

31. **Gifts.**—Large numbers of plants and seeds have been presented during the year, some for the garden, some for distribution to our Fellows; gifts of money for Laboratory purposes have also to be acknowledged; of paintings for the Laboratory from Mr. Frank Galsworthy; of a framed portrait of Mr. H. B. May, V.M.H., Chairman of the Floral Committee, and for many years of the Wisley Committee; of books for the Library, including books to the value of £100 purchased out of a gift from an American Fellow, Mr. A. C. Burrage.

32. **The Staff.**—The staff has, we regret to say, suffered the loss of Alfred Chambers, label writer, by death. Mr. C. Gosden, Superintendent of the Rock Garden since 1920, has resigned to take up another appointment, and Mr. Jesse Harris, late of Dupplin Castle Gardens, has been appointed to his place; the increase in clerical work has entailed the appointment of an extra clerk. Labour for the garden has been difficult to secure, but six new cottages have been erected, and when completed it is hoped that difficulties in this direction will be relieved.

33. **General.**—Fellows may further the work at Wisley in many ways by gifts of plants and seeds for the garden and of books for the library, the establishment of Scholarships both for general and research students, either of a permanent or temporary character, the erection of a hostel for the students—a much-to-be-desired addition—and by their interest in the activities of the Garden and its Staff.

34. **Conclusion.**—The Council takes the opportunity of thanking the members of its Garden, Floral, and Fruit Committees and of various sub-committees for the help they have so freely given during the past year. It also wishes to express its thanks to the Horticultural Press for helping to make public the activities of the Society at Wisley, and to the members of the staff for their efforts in carrying out the work that is entrusted to them.

Signed on behalf of the Council,  
LAMBOURNE,  
President.

December 16, 1924.

Dr.

## ANNUAL REVENUE &amp; EXPENDITURE ACCOUNT

	£	s.	d.	£	s.	d.
To ESTABLISHMENT CHARGES—						
Ground Rent . . . . .	690	0	0			
Rates and Taxes . . . . .	946	9	8			
Water Rate . . . . .	76	16	5			
Electric Light . . . . .	306	16	2			
Gas . . . . .	128	16	8			
				2,148	18	11
Salaries and Wages . . . . .	5,030	19	10			
Annuities . . . . .	52	0	0			
Printing and Stationery . . . . .	889	19	7			
Publications . . . . .	166	17	9			
Botanical Magazine, Volumes 1922-3-4 . . . . .	574	3	7			
Postages . . . . .	685	16	7			
Fuel . . . . .	158	18	0			
Professional Fees . . . . .	314	4	0			
Gratuities . . . . .	259	6	0			
Repairs and Renewals . . . . .	454	2	4			
Miscellaneous Expenses . . . . .	255	6	0			
				8,841	13	8
„ INSURANCES . . . . .				71	3	5
„ JOURNAL, PRINTING AND POSTAGE . . . . .				1,660	10	7
„ STAFF PENSIONS . . . . .	724	19	8			
Less contributed by Staff, as per scheme . . . . .	200	10	0			
				524	9	8
„ MEETINGS—						
Spring Meeting (Chelsea) . . . . .	3,871	4	2			
Autumn Meeting (Holland Park) . . . . .	1,320	8	2			
Special Autumn Meeting (Fruit Show) . . . . .	434	13	9			
Expenses, Floral Meetings and Conferences . . . . .	196	4	5			
Council, Committee, and Deputation Expenses . . . . .	616	18	10			
Painting Certificates . . . . .	117	0	6			
				6,556	9	10
„ INSPECTION OF GARDENS . . . . .				350	7	8
„ PRIZES AND MEDALS—						
Awarded at Society's Meetings . . . . .				500	5	7
„ CONTRIBUTION TO LINDLEY LIBRARY—						
Purchase of Books . . . . .	321	5	1			
Contribution to Expenses as per Trust Account see p. xviii . . . . .	238	13	10			
				559	18	11
„ SPECIAL EXPENDITURE—						
Pritzel Revision . . . . .	687	10	8			
Donation to Kingdon Ward's Expedition . . . . .	150	0	0			
Gardeners' Royal Benevolent Institution . . . . .	262	10	0			
Trinidad Imperial College . . . . .	105	0	0			
Bayley-Balfour Memorial . . . . .	105	0	0			
				1,310	0	8
„ DEPRECIATION—						
Hall Glass Roof, Furniture, and Appliances for Meetings, etc. . . . .	405	7	7			
Education Charts . . . . .	200	0	0			
				605	7	7
„ EXAMINATIONS IN HORTICULTURE—						
Expenses . . . . .	236	14	4			
Less Fees . . . . .	165	1	0			
				71	13	4
„ BALANCE carried forward . . . . .				24,487	9	1
				<u>£47,688</u>	<u>8</u>	<u>11</u>
To WISLEY—						
Excess of Expenditure over Revenue . . . . .	7,941	4	4			
Less Capital Fund Account, being decrease in Stock . . . . .	111	6	11			
				7,829	17	5
„ GENERAL RESERVE FUND . . . . .				15,000	0	0
„ WEATHER INSURANCE FUND FOR CHELSEA AND OTHER MEETINGS . . . . .						
				500	0	0
„ BALANCE AS PER BALANCE SHEET . . . . .				1,157	11	8
				<u>£24,487</u>	<u>0</u>	<u>1</u>



[illegible]

	ASSETS					
	£	s.	d.	£	s.	d.
CAPITAL EXPENDITURE—						
HALL AND OFFICES—						
As at 31st December, 1923 .				41,277	13	4
FURNISHING HALL AND OFFICES—						
As at 31st December, 1923 .	2,725	3	7			
Add Purchases, 1924 .	32	8	6			
				2,757	12	1
FREEHOLD PROPERTY, WISLEY—						
As at 31st December, 1923 .	8,268	16	6			
Add Expenditure, Dwelling-houses .	3,500	0	0	11,768	16	6
					55,804	1 11
APPLIANCES FOR MEETINGS .					366	14 3
SUNDRY DEBTORS AND PAYMENTS MADE IN ADVANCE					1,931	9 3
WORKING WATER CO.—						
Deposit in respect of laying water mains from Ripley to Wisley Gardens .					1,260	0 0
EDUCATION CHARTS .				242	15	0
Less Depreciation .				200	0	0
					42	15 0
BOTANICAL MAGAZINE—						
As at 31st December, 1923 .				371	18	7
Add Expenses, 1924 .				172	12	7
					544	11 2
Less Sales, 1924 .				404	9	1
					140	2 1
INVESTMENT OF DEPRECIATION AND RENEWALS FUND—						
5% War Loan, 1929-47 .	£4,173	15	7 cost	3,898	4	11
3½% War Loan, 1925-28 .	£305	5	1 „	266	16	6
3½% Conversion Loan, 1961 „	£1,057	14	8 „	803	11	8
5% London County Stock, 1940-60 .	£610	14	0 „	514	12	10
2½% Met. Consld. Stock, 1919-49	£1,000	2	0 „	515	5	2
2½% Plymouth Corporation Redeemable Stock, 1918-58 .	£225	9	4 „	111	6	5
6% Plymouth Corporation Redeemable Stock, 1940-50 .	£123	15	6 „	117	5	3
2½% Bristol Cor. Deb. Red. Stock, 1957 .	£607	12	0 „	282	13	6
				6,509	16	3
Add Cash for Investment .				405	7	7
					6,915	3 10
INSURANCE FUND INVESTMENT ACCOUNT—						
Balance as at 31st December, 1923 .				1,442	4	9
Add Cash for Investment .				500	0	0
					1,942	4 9
INVESTMENTS, as per Schedule .					46,642	0 0
GENERAL RESERVE FUND—						
Investments .				30,000	0	0
Cash on Deposit—National Union Discount Co. .				15,000	0	0
					45,000	0 0
CASH—						
At Bank .				3,166	11	0
Less cash awaiting Investment—						
Wisley Depreciation Fund .	£130	0	0			
Vincent Square Fund .	405	7	7			
Insurance Fund .	500	0	0			
				1,035	7	7
					2,131	3 5
					£162,175	14 6

I have audited the books from which the foregoing Accounts are compiled, and certify that they exhibit a true and correct statement of the position of the Society on 31st December, 1924. In the above total of Assets, £162,175 14s. 6d., are included investments and cash amounting to a total sum of £6,915 3s. 10d., representing depreciation reserves on account of such matters as Roof Renewal, Hall Painting, etc., and these Funds are not available for the General Purposes of the Society.

# Dr. WISLEY GARDENS—ANNUAL REVENUE & EXPENDITURE

	£	s.	d.	£	s.	d.
To SALARIES—						
Wisley Gardens and Research Station . . . . .				3,744	7	0
„ RATES AND TAXES . . . . .	106	16	10			
„ WATER RATE . . . . .	70	3	1			
„ INSURANCES . . . . .	152	1	3			
„ LABOUR . . . . .	3,594	7	9			
„ GARDEN IMPLEMENTS . . . . .	183	8	5			
„ LOAM AND MANURE . . . . .	118	0	1			
„ REPAIRS . . . . .	389	0	1			
„ FUEL . . . . .	427	19	11			
„ PROFESSIONAL FEES . . . . .	49	9	6			
				5,091	6	11
„ MISCELLANEOUS EXPENSES—						
Garden . . . . .	1,094	17	0			
Laboratory . . . . .	98	18	5			
Trees and Shrubs . . . . .	211	8	5			
				1,405	3	10
„ STAFF PENSIONS . . . . .	278	19	7			
Less contributed by Staff, as per scheme . . . . .	176	10	0			
				102	9	7
„ DEPRECIATION—						
Glass Houses, Plant and Materials . . . . .	476	6	11			
Motors . . . . .	260	0	0			
				736	6	11
„ SPECIAL EXPENDITURE—						
Telephone . . . . .				11	11	11
				£11,091	6	2



# ACCOUNT FOR YEAR ENDED 31st DECEMBER, 1924.

Cr.

	£	s.	d.
By DIVIDENDS AND INTEREST . . . . .	1,356	7	10
„ PRODUCE SOLD . . . . .	1,080	1	8
„ ANALYSIS FEES . . . . .	26	2	0
„ STUDENTS' FEES . . . . .	78	10	0
„ DONATIONS . . . . .	5	5	0
„ CONTRIBUTION BY MINISTRY OF AGRICULTURE— On account of Fruit Testing Station . . . .	603	15	4
„ BALANCE, being Excess of Expenditure over Income, carried to Revenue and Expendi- ture Account, Vincent Square . . . . .	7,941	4	4
	<u>£11,091 6 2</u>		

## WISLEY GARDENS—BALANCE

LIABILITIES.

		£	s.	d.	£	s.	d.
CAPITAL FUNDS ACCOUNT—							
As at 31st December, 1923	.	.	.	.	35,071	18	10
Less Decrease in Stocks 31st December, 1924	.	.	.	.	III	6	II
					<hr/>	34,960	II II
ENDOWMENT TRUST FUND						28,972	7 II
(The difference between this Fund and the Investment Account on the Assets side is due to a change in the Investments which was made in 1921.)							
DEPRECIATION AND RENEWALS RESERVE FUND—							
As at 31st December, 1923	.	.	.	.	5,101	19	3
Added 1924	.	.	.	.	130	0	0
					<hr/>	5,231	19 3
					<hr/>		
					£69,164 19 1		

# SHEET, 31st DECEMBER, 1924.

## ASSETS.

DWELLING HOUSES—	£	s.	d.	£	s.	d.
As at 31st December, 1923 . . . . .	5,651	17	4			
GLASS HOUSES, RANGES, POTTING SHEDS, &c.—						
As at 31st December, 1923 . . . . .	5,202	6	0			
LABORATORY—						
As at 31st December, 1923 . . . . .	20,623	18	2			
				31,478	1	6

N.B.—The Hanbury Trust Estate is, under the Trust Deed, vested in the Society only so long as it is in the position to use it as an Experimental Garden. The value of the expenditure thereon depends therefore on the continued use of the Garden by the Society.

STOCK FUEL . . . . .				220	0	0
MOTOR CAR AND LORRY . . . . .	510	3	0			
Less Depreciation . . . . .	260	0	0			
				250	3	0

INVENTORY OF PLANT AND LOOSE EFFECTS (as taken by Mr. Chittenden)—						
Gardens and Laboratory . . . . .	1,853	8	0			
Farm . . . . .	1,237	14	3			
				3,091	2	3
				299	17	10

## LIBRARY . . . . .

## INVESTMENT OF DEPRECIATION AND RENEWALS

### RESERVE ACCOUNT—

5% War Loan, 1929-47 . . . . .	£2,481	8	9	cost	2,377	5	11
3½% War Loan, 1925-28 . . . . .	£395	18	11	„	346	9	0
3½% Conversion Loan, 1961 . . . . .	£515	15	2	„	390	3	0
5% London Cnty. Stk. 1940-60 . . . . .	£785	5	3	„	661	13	6
2½% Met. Cons. Stk. 1919-49 . . . . .	£1,287	9	2	„	662	19	3
2½% Plymouth Cor. Red. Stock, 1918-58 . . . . .	£288	8	10	„	142	1	0
6% Plymouth Cor. Red. Stock, 1940-50 . . . . .	£159	18	4	„	151	12	4
2½% Bristol Cor. Deb. Red. Stock, 1957 . . . . .	£795	14	6	„	369	15	3

Add Cash for Investment . . . . .				5,101	19	3
				130	0	0
				5,231	19	3

## ENDOWMENT TRUST FUND INVESTMENTS—

5% War Loan, 1929-47 . . . . .	£9,350	cost	8,972	7	11
3½% Conversion Loan, 1961 . . . . .	£2,484/4/1	„	2,000	0	0
5% London County Stk., 1940-60 . . . . .	£600	„	505	12	0
3½% London County Cons. Stk. . . . .	£135/8/4	„	130	0	0
2½% Met. Cons. Stk., 1919-49 . . . . .	£970	„	499	12	0
6% Ply. Cor. Red. Stk., 1940-50 . . . . .	£30/9/4	„	29	6	4
2½% Ply. Cor. Red. Stk., 1918-58 . . . . .	£400	„	197	1	0
2½% Bristol Cor. Deb. Red. Stk., 1957 . . . . .	£600	„	278	18	6
London & North Eastern Rly. 4% Deb. Stock . . . . .	£3,500	„	3,535	0	0
Can. Pac. Ry. 4% Per. Cons. Deb. Stk. . . . .	£4,632	„	3,890	17	6
Buenos Ayres Gt. S. Rly. 5% Non-Cum. Pf. Stk. . . . .	£2,500	„	2,825	0	0
City of Moscow Loan, 1912, 4½% Bonds . . . . .	£6,000	„	5,730	0	0
			28,593	15	3

No interest was received during the year on the City of Moscow Loan.

£69,164 19 1

I have audited the books from which the foregoing Accounts are compiled, and certify that they exhibit a true and correct statement of the position on the 31st December, 1924.

ALFRED C. HARPER, F.C.A., Auditor

(HARPER BROS. & FEATHER, Chartered Accountants),

20th January, 1925.

35 Great Tower Street, London, E.C. 3.

Dr.

**ALFRED DAVIS**

Bequeathed to the Society in 1870 for Annual Prizes

To Amount of Fund, 31st December, 1923	£	s.	d.	£	s.	d.
	946	0	3			

„ Dividends received 1924	£	s.	d.	£	s.	d.
	946	0	3	53	7	9

**WILLIAMS**

Raised by Donations in 1891 in Memory of

To Amount of Fund, 31st December, 1923	£	s.	d.	£	s.	d.
	204	2	5			

„ Balance 31st December, 1923	£	s.	d.	£	s.	d.
„ Dividends received 1924	204	2	5	77	16	11
				8	8	11
				86	5	10

**MASTERS**

Raised by Donations in 1908 in Memory of Dr. Masters

To Amount of Fund, 31st December, 1923	£	s.	d.	£	s.	d.
	542	17	0			

„ Balance 31st December, 1923	£	s.	d.	£	s.	d.
„ Dividends received 1924	542	17	0	147	19	5
				20	0	0
				167	19	5

**NICHOLSON**

Raised by Donations in 1908 in Memory of

To Amount of Fund, 31st December, 1923	£	s.	d.	£	s.	d.
	180	14	4			

„ Dividends received 1924	£	s.	d.	£	s.	d.
	180	14	4	7	8	8
				7	8	8

**SCHRÖDER**

Provided by the Royal Horticultural Society in Memory of the late Baron

To Amount of Fund, 31st December, 1923	£	s.	d.	£	s.	d.
	557	14	6			

„ Balance 31st December, 1923	£	s.	d.	£	s.	d.
„ Dividends received 1924				6	6	8
				20	0	0
				26	6	8

**TRUST FUND.**

Cr.

or in any other way the Council may determine.

	£	s.	d.	£	s.	d.
By London County 5% Stock, 1940-60, £375 . . .	316	0	0			
„ Met. Consd. 2½% Stock, 1919-40, £610 . . .	314	4	0			
„ Plymouth Corpn. 2½% Red. Stock, 1918-58, £200	98	10	6			
do. 6% do. 1940-50, £32 7s. 4d.	31	2	3			
„ Bristol Corpn. 2½% Deb. Stock, 1957, £400. . .	186	3	6			
	<u>946</u>	<u>0</u>	<u>3</u>			
„ Revenue and Expenditure Account . . . . .				£53	7	9

**MEMORIAL FUND.**

R; S; Williams towards Prizes and Medals.

	£	s.	d.	£	s.	d.
By East India Railway Co. Annuity, Class B £7 . .	168	0	0			
„ New South Wales Government 4% Inscribed Stock, 1942-62, £36 3s. 1d. . . . .	36	2	5			
	<u>204</u>	<u>2</u>	<u>5</u>			
„ Balance in hands of R.H. Society . . . . .				86	5	10
				<u>£86</u>	<u>5</u>	<u>10</u>

**MEMORIAL FUND.**

towards the Provision of one or more Annual Lectures.

	£	s.	d.	£	s.	d.
By London Midland & Scottish 4% Preference Stock, £250 . . . . .	290	13	6			
„ London Midland & Scottish 4% Guaranteed Stock, £250 . . . . .	252	3	6			
	<u>542</u>	<u>17</u>	<u>0</u>			
„ Lectures Given . . . . .				40	0	0
„ Balance in hands of R.H. Society . . . . .				127	19	5
				<u>£167</u>	<u>19</u>	<u>5</u>

**MEMORIAL FUND.**

George Nicholson for Prizes to Wisley Students.

	£	s.	d.	£	s.	d.
By Local Loans, 3% £31 11s. 0d. . . . .	20	1	5			
„ Tasmanian Government 4% Inscribed Stock, 1940-50, £162 4s. 5d. . . . .	160	12	11			
	<u>180</u>	<u>14</u>	<u>4</u>			
„ Prizes . . . . .				6	2	0
„ Wisley Laboratory Prize Fund . . . . .				1	6	8
				<u>£7</u>	<u>8</u>	<u>8</u>

**PENSION.**

Schröder to pay to Gardeners' Royal Benevolent Institution for one Pension.

	£	s.	d.	£	s.	d.
By Great Western Railway 4 per cent. Debenture Stock, £500 . . . . .	557	14	6			
„ Gardeners' Royal Benevolent Institution . . . .				20	0	0
„ Balance in hands of R.H. Society . . . . .				6	6	8
				<u>£26</u>	<u>6</u>	<u>8</u>

Dr.

**LINDLEY LIBRARY**

	£	s.	d.	£	s.	d.
To Amount of Fund, 31st December, 1923 . . . . .	7,783	15	7			
„ Contribution from R.H. Society, 31st December, 1924 . . . . .	321	5	1			
	<u>8,105 0 8</u>					
To Balance 31st December, 1923 . . . . .				10	0	0
„ Dividends and Donations received 1924 . . . . .				45	9	6
„ Contribution from R.H. Society, 31st December, 1924 . . . . .				238	13	10
				<u>£294 3 4</u>		

**PRITZEL REVISION**

Fund to be raised for the Revision of

	£	s.	d.	£	s.	d.
To Amount of Fund, 31st December, 1923 . . . . .	859	2	2			
„ Contribution by R.H. Society . . . . .				687	10	8
„ Dividends received 1924 . . . . .				34	3	10
				<u>£721 14 6</u>		

**SIR JAMES KNOTT**

Bequeathed to the Society in 1920 for the purpose

	£	s.	d.	£	s.	d.
To Amount of Fund, 31st December, 1923 . . . . .	600	0	0			
„ Balance, 31st December, 1923 . . . . .				60	0	0
„ Dividends received 1924 . . . . .				30	0	0
				<u>£90 0 0</u>		

**VEITCH MEMORIAL**

For the Encouragement

	£	s.	d.	£	s.	d.
To Amount of Fund, 31st December, 1923 . . . . .	1,673	19	1			
	<u>1,673 19 1</u>					
„ Balance in hands of R.H. Society . . . . .				275	2	2
„ Dividends and Interest received 1924 . . . . .				83	14	0
				<u>£358 16 2</u>		

**TRUST.**

Cr.

	£	s.	d.	£	s.	d.
By London Midland & Scottish Railway 4% Preference Stock, £1,137 . . . . .	1,458	15	7			
„ Value of Library, 31st December, 1923 . . . . .	6,325	0	0			
„ Purchase of Books, 1924 . . . . .	321	5	1			
	<u>8,105 0 8</u>					
By Librarian's Salary . . . . .				275	0	0
„ Insurance . . . . .				9	3	4
„ Balance in hands of R.H. Society . . . . .				10	0	0
				<u>£294 3 4</u>		

**FUND.**

Pritzel's Iconum Botanicarum Index.

	£	s.	d.	£	s.	d.
By India 2½ per cent. Stock, £1,367 13s. 6d. . . . .	859	2	2			
„ Expenses of Revision, 1924 . . . . .				687	10	8
„ Loan, R.H. Society, repaid . . . . .				34	3	10
				<u>£721 14 6</u>		

**TRUST.**

of providing a Scholarship for Wisley Students.

	£	s.	d.	£	s.	d.
By War Loan, 5% 1929-47 . . . . .	600	0	0			
„ Balance in hands of R.H. Society . . . . .				90	0	0
				<u>£90 0 0</u>		

**TRUST FUND.**

of Horticulture.

	£	s.	d.	£	s.	d.
By Victorian Government 5% Inscribed Stock, £1,354 os. 1d. . . . .	1,354	0	1			
„ War Loan, 5% 1929-47, £319 19s. 0d. . . . .	319	19	0			
	<u>1,673 19 1</u>					
„ Amount distributed . . . . .				6	11	0
„ Balance in hands of R.H. Society . . . . .				352	5	2
				<u>£358 16 2</u>		

## SCHEDULE OF INVESTMENTS.

31st December, 1924.

			£	s.	d.
5 % War Loan (1929-1947)	£9,712 10s. 6d.	. . . . . cost	9,440	2	11
3½ % War Loan (1925-28)	£4,998 16s. 0d.	. . . . . „	4,363	16	9
3½ % Conversion Loan (1961)	£6,399 12s. 4d.	. . . . . „	5,000	0	0
3½ % Local Loans, £5,800 . . . . .		„	6,006	16	6
2½ % India Stock, £186 9s. 9d. . . . .		„	109	2	2
3½ % Dominion of Canada Registered Stock (1930-1950)					
£2,000 . . . . .		„	2,000	0	0
5 % London County Stock (1940-60)	£2,114 0s. 9d. . . . .	„	1,781	3	2
2½ % Metropolitan Consd. Stock (1919-49)	£3,462 8s. 10d. . . . .	„	1,783	6	7
2½ % Plymouth Corp. Red. Stock (1918-58)	£786 1s. 10d. . . . .	„	386	19	7
6 % Plymouth Corp. Red. Stock (1940-50)	£427 13s. 6d. . . . .	„	405	5	3
2½ % Bristol Corp. Deb. Red. Stock (1957)	£2,096 13s. 6d. . . . .	„	974	7	9
4½ % Central Argentine Railway, Limited, Consolidated Preference Stock, £2,800 . . . . .		„	2,907	3	6
4 % Central Argentine Railway, Limited, Debenture Stock, £500 . . . . .		„	537	15	10
5 % Havana Terminal Railroad Company Mortgage Debenture Bonds, £8,300 . . . . .		„	8,946	0	0
Mortgage on Freehold, £2,000 . . . . .		„	2,000	0	0
			<u>£46,642</u>	<u>0</u>	<u>0</u>

## ON ACCOUNT OF GENERAL RESERVE FUND.

			£	s.	d.
5 % War Loan, 1929-47 . . . . .	£19,837 9 6	cost	19,951	7	9
3½ % Conversion Loan, 1961 . . . . .	£6,606 17 5	„	5,049	10	0
London & North Eastern Railway 4 % Debs. . . . .	£5,510 0 0	„	4,999	2	3
			<u>£30,000</u>	<u>0</u>	<u>0</u>



## GENERAL MEETING.

FEBRUARY 24, 1925.

Mr. C. T. MUSGRAVE in the Chair.

One hundred and seventy-two Fellows and five Associates were elected and three Societies affiliated.

A lecture on "The History and Mission of the Botanical Magazine" was given by Dr. O. Stapf (see p. 29).

## GENERAL MEETING.

MARCH 10, 1925.

Mr. W. CUTHBERTSON, J.P., V.M.H., in the Chair.

One hundred and thirty Fellows and two Associates were elected, and nine Societies affiliated.

A lecture on "Lawns" was given by Capt. H. G. F. MacDonald.

## GENERAL MEETING.

MARCH 24, 1925.

Mr. T. HAY, V.M.H., in the Chair.

One hundred and thirteen Fellows and two Associates were elected, and four Societies affiliated.

A lecture on "Hardy Annuals" was given by Mr. E. R. Janes.

## GENERAL MEETING.

APRIL 7, 1925.

Dr. A. W. HILL, Sc.D., F.R.S., in the Chair.

One hundred and thirty-seven Fellows and two Associates were elected, and six Societies affiliated.

A Masters Memorial Lecture on "Problems of Vegetative Propagation" was given by Professor J. H. Priestley (see p. 1).

## DEPUTATION TO HAARLEM INTERNATIONAL SHOW.

APRIL 11-19, 1925.

Members of Deputation:

Sir WILLIAM LAWRENCE, Bt.  
W. R. DYKES, M.A., L.-ès-L.

*Gold Medal.*

To Messrs. C. G. van Tubergen (jun.), Haarlem.

## DAFFODIL SHOW.

APRIL 15-16, 1925.

*Chief Awards.**The Peter Barr Memorial Cup.*

To Mr. Herbert Chapman, of Rye, Sussex.

Class 21.—Twelve varieties of Daffodils raised by Exhibitor.

*First Prize, Engleheart Challenge Cup.*

To Mr. P. D. Williams, St. Keverne.

ALL PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

Class 24.—Twelve varieties of Daffodils not in commerce.

*First Prize, Gold Medal.*

To Mr. P. D. Williams.

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GENERAL MEETING.

APRIL 21, 1925.

Mr. W. A. BILNEY, V.M.H., in the Chair.

One hundred and one Fellows and two Associates were elected, and three Societies affiliated.

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DEPUTATION TO BIRMINGHAM DAFFODIL SHOW.

APRIL 22-23, 1925.

Members of Deputation :

E. A. BOWLES, M.A., V.M.H.  
W. R. DYKES, M.A., L.-ès-L.  
R. CORY.

*Awards.*

*Gold Medal.*

To Donard Nursery Co., for Daffodils.

To Dr. N. Y. Lower, for new seedling Daffodils.

*Silver-gilt Flora Medal.*

To Messrs. Barr, for Daffodils.

*Silver-gilt Banksian Medal.*

To Mr. F. H. Chapman, for 36 varieties of Daffodils.

To Mr. F. H. Chapman, for 12 new seedling Daffodils, raised by exhibitor.

*Silver Banksian Medal.*

To Mr. J. L. Richardson, for 36 varieties of Daffodils.

To Mr. J. S. Arkwright, for new seedling Daffodils.

To Mr. G. L. Wilson, for new seedling Daffodils.

*Bronze Lindley Medal.*

To Miss R. Pope, for collection of old varieties of Daffodils.

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GENERAL MEETING.

MAY 5, 1925.

Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair.

One hundred and ninety-two Fellows and three Associates were elected, and one Society affiliated.

A lecture on "Alpine Plants in Gardens" was given by Monsieur H. Correvon.

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CHELSEA SHOW.

Held in the ROYAL HOSPITAL GARDENS, CHELSEA, on MAY 19-23, 1925.

A lecture on "Plants of Special Interest among those exhibited" was given by Dr. A. B. Rendle, F.R.S., V.M.H.

The following accepted the invitation of the Council to assist in judging the exhibits:

ALEXANDER, H. G.	JONES, H. J., V.M.H.
ASHMORE, A. J.	LODER, G. W. E.
BALFOUR, F. R. S.	MCLEOD, J. F.
BARNES, N. F., V.M.H.	MOORE, Dr. F. CRAVEN
CAMPBELL, D.	MURRELL, O.
CHRISTIE, J. E.	NEAL, E.
CHRISTY, W. M.	NEEDHAM, C. W.
COLMAN, Sir JEREMIAH, Bt., V.M.H.	OSBORN, A.
CORY, R.	PAGE, W. H.
CRANFIELD, W. B.	PETTIGREW, W. W.
CYPHER, J. J., V.M.H.	PILKINGTON, G. L.
DARLINGTON, H. R.	PRESTON, F. G.
FARMER, Professor J. B.	PRINCE, H.
FENWICK, M.	PUDDLE, F. C.
FIELDER, C. R., V.M.H.	ROTHSCHILD, LIONEL DE
GUTTRIDGE, J. J.	STANLEY, Lady BEATRIX
HALL, Sir DANIEL, K.C.B.	STERN, F. C.
HANBURY, F. J., V.M.H.	STEVENSON, T.
HARDCASTLE, E.	SYMONS-JEUNE, B.
HARRIS, J.	TIPPING, H. A.
HARROW, R. L.	TITCHMARSH, C. C.
HEADFORT, Marquess of	VILMORIN, JACQUES DE
HORT, Sir ARTHUR F., Bt.	WALLACE, W. E.
IRVING, W.	WIGHTMAN, Mrs.
JAMES, Hon. ROBERT	WILSON, G.

#### *List of Awards.*

#### CHALLENGE CUPS.

*Sherwood Cup, for the most meritorious group (excluding Orchids).*

To Messrs. C. Engelmann, for Carnations.

*"Daily Graphic" Cup, for the best rock garden.*

To Mr. G. G. Whitelegg.

*Cain Cup, for the best exhibit by an amateur.*

To the Hon. Sir John Ward, K.C.V.O. (gr. J. C. Beckett), for fruits.

*Orchid Challenge Cup, for the best exhibit of Orchids by an amateur on a space not exceeding 60 square feet. Open only to those who employ not more than three assistants in Orchid houses (including the head gardener).*

To H. T. Pitt, Esq. (gr. F. W. Thurgood).

#### SPECIAL CUPS.

*Allwood Carnation Bowl, for the best group of Carnations exhibited by an amateur.*

To Sir William E. Cain, Bt. (Exors. of the late) (gr. C. Moore).

#### ROSES.

*Gold Medal.*

To Mr. E. J. Hicks, for Roses.

*Silver Cup.*

To Messrs. A. J. Allen, for Roses.

*Silver-gilt Flora Medal.*

To Messrs. Cutbush, for Roses.

*Silver-gilt Banksian Medal.*

To Messrs. B. R. Cant, for Roses.

*Silver Flora Medal.*

To Messrs. F. Cant, for Roses.  
To Messrs. Chaplin, for Roses.

*Silver Banksian Medal.*

To Mr. J. H. Pemberton, for Roses.  
To Mr. George Prince, for Roses.

FORMAL GARDENS, ETC.

*Gold Medal.*

To Messrs. R. Wallace, for formal garden.  
To Messrs. J. Carter, for formal garden.

*Silver Cup.*

To Mr. J. MacDonald, for grass garden.  
To Messrs. Vernon Bros., for formal garden.  
To Mr. R. Winder, for formal garden.

*Silver-gilt Flora Medal.*

To Messrs. Bakers, for formal garden.  
To Messrs. R. & G. Cuthbert, for Azalea garden.  
To Mr. Ernest Dixon, for formal garden.

*Silver Flora Medal.*

To Messrs. Wm. Wood, for formal garden.  
To Messrs. Cheal, for formal garden.  
To Messrs. W. H. Gaze, for formal garden.  
To Messrs. Johnstone, Garden Contractors, Ltd., for formal garden.  
To Messrs. Maxwell & Beale, for formal garden.

*Silver Banksian Medal.*

To Horsecombe Quarries & Stone Works, for formal garden.  
To Mr. J. Klinkert, for topiary and formal garden.

TULIPS, ETC.

*Gold Medal.*

To Messrs. Barr, for bulbous herbaceous and plants.

*Silver Cup.*

To Messrs. Dobbie, for Tulips.

*Silver-gilt Flora Medal.*

To Mr. W. A. Watts, for Tulips.  
To Mr. H. G. Longford, for Tulips.

*Silver-gilt Banksian Medal.*

To Messrs. R. H. Bath, for Tulips.

*Silver Flora Medal.*

To Messrs. Pearson, for Tulips.  
To Maytham Gardens, for Tulips.

*Silver Banksian Medal.*

To Messrs. E. Paul, for Tulips, etc.

CARNATIONS.

*Gold Medal and Congratulations.*

To Messrs. C. Engelmann, for Carnations.

*Gold Medal.*

To Messrs. Allwood Bros., for Carnations.

*Silver-gilt Banksian Medal.*

To Messrs. Stuart Low, for Carnations.  
To Mr. James Douglas, for Carnations.

*Silver Flora Medal and Allwood Cup.*

To Sir W. E. Cain, Bt. (Executors of the late), for Carnations.

*Silver Banksian Medal.*

To Messrs. Keith Luxford, for Carnations.

## FRUIT AND VEGETABLES.

*Gold Medal.*

To Major the Hon. Sir John Ward (gr. C. Beckett), for fruit.  
To the Hon. Vicary Gibbs (gr. E. Beckett), for vegetables.

*Silver Cup.*

To Messrs. Bunyard, for fruit.  
To Messrs. Laxton Bros., for Strawberries.

*Silver Hogg Medal.*

To Messrs. Rivers, for fruit trees in pots.

*Silver Knightian Medal.*

To Messrs. Sutton, for Potatoes.

*Bronze Hogg Medal.*

To Mr. V. C. Vickers (gr. W. Watkins), for Raspberries.

## ROCK GARDENS.

*Gold Medal.*

To Mr. G. G. Whitelegg, for rock garden.

*Silver Cup.*

To Mr. H. Brook, for rock garden.  
To Messrs. Pulham, for rock garden.

*Silver-gilt Flora Medal.*

To Messrs. Clarence Elliott, for rock garden.

*Silver Flora Medal.*

To Messrs. Cutbush, for rock garden.

*Silver Banksian Medal.*

To Messrs. Hodscens, for rock garden.  
To Messrs. Gavin Jones & Ingwersen, for rock garden.

## ORCHIDS (AMATEUR EXHIBITS).

*Gold Medal.*

To Sir J. Colman, Bt. (gr. J. Collier), for Orchids.

*Silver Cup.*

To H. T. Pitt, Esq. (gr. F. W. Thurgood), for Orchids.

*Silver-gilt Lindley Medal.*

To A. C. Burrage, Esq., for Orchids.

## ORCHIDS (TRADE EXHIBITS).

*Gold Medal and Congratulations.*

To Messrs. Charlesworth, for Orchids.

*Silver Cup.*

To Messrs. Cowan, for Orchids.  
To Messrs. Stuart Low, for Orchids.

*Silver-gilt Flora Medal.*

To Messrs. J. Cypher, for Orchids.  
To Messrs. Mansell & Hatcher, for Orchids.

*Silver-gilt Banksian Medal.*

To Messrs. Flory & Black, for Orchids.

*Silver Flora Medal.*

To Mr. H. Dixon, for Orchids.  
To Mr. Sander, for Orchids.

SWEET PEAS, ETC.

*Gold Medal and Congratulations.*

To Messrs. Dobbie, for Sweet Peas.

*Silver-gilt Banksian Medal.*

To Messrs. Alex. Dickson, for Sweet Peas.  
To Mr. S. Smith, for Cacti, etc.

*Silver Flora Medal.*

To Miss S. Thompson, for Cacti.

*Silver Banksian Medal.*

To Messrs. R. Bolton, for Sweet Peas.

ALPINE PLANTS, ETC.

*Gold Medal and Congratulations.*

To Lady Aberconway and the Hon. H. D. MacLaren, for Primulas.

*Silver Cup.*

To Messrs. Oliver & Hunter, for alpinos.

*Silver-gilt Flora Medal.*

To Mr. H. Hemsley, for alpinos.  
To Messrs. W. H. Rogers, for alpinos, etc.  
To Messrs. Gavin Jones & Ingwersen, for alpinos, etc.  
To Messrs. R. Tucker, for alpinos and herbaceous.  
To Messrs. C. Elliott, for alpinos.  
To Dr. J. McWatt, for Primulas.

*Silver-gilt Banksian Medal.*

To Messrs. Bakers, for alpinos, etc.  
To Messrs. Bowell & Skarratt, for alpinos, etc.  
To Messrs. M. Prichard & Sons, for rock plants.  
To Messrs. Carter Page, for alpinos.  
To Messrs. Maxwell & Beale, for alpinos.  
To Messrs. Prichard & Co., for alpine plants.  
To Mr. E. Scaplehorn, for hardy plants.  
To Mr. W. H. Walters, for Cypripediums and Fritillaries, etc.

*Silver Flora Medal.*

To Backhouse Nurseries (York), for alpine plants, etc.  
To Messrs. J. Cheal, for rock and alpine plants.  
To Aldersey Hort. College, for Primulas.  
To Central Garden Supplies, for alpine plants.  
To Messrs. Sheppards, for rock and alpine plants.  
To Messrs. Skelton & Kirby, for rockery.  
To Mr. R. V. Rogers, for alpinos, etc.

*Silver Banksian Medal.*

- To G. H. Crow, Esq. (gr. A. Tingley), for rock plants.
- To Mr. G. Reuthe, for alpine plants, etc.
- To Miss K. Hopkinson, for rock plants.

*Bronze Flora Medal.*

- To Mr. E. Dixon, for alpines and rock gardens.

## SHRUBS, ETC.

*Gold Medal.*

- To Messrs. R. W. Wallace, for Rhododendrons, Lilies and Irises.

*Silver Cup.*

- To Messrs. R. & G. Cuthbert, for Azaleas.
- To Mr. G. Reuthe, for shrubs.
- To Messrs. M. Koster, for Rhododendrons and Azaleas.
- To Messrs. Hillier, for shrubs.

*Silver-gilt Flora Medal.*

- To Mr. Anthony Waterer (Executors of the late), for shrubs.
- To Messrs. J. Waterer, Sons & Crisp, for shrubs.
- To Donard Nursery Co., for flowering shrubs, etc.
- To Mr. R. C. Notcutt, for shrubs.
- To Yokohama Nursery Co., for Japanese dwarf trees and miniature gardens.
- To Messrs. A. Charlton, for shrubs.
- To Messrs. W. Fromow, for Japanese Maples.
- To Messrs. L. R. Russell, for Maples and climbers, etc.
- To Messrs. G. Jackman, for Clematis.

*Silver-gilt Banksian Medal.*

- To Messrs. J. Cheal, for ornamental shrubs.
- To Messrs. Wm. Cutbush, for clipped trees and shrubs.
- To Messrs. Stuart Low, for shrubs.
- To Messrs. R. Gill, for shrubs, etc.

*Silver Flora Medal.*

- To Messrs. N. J. Endtz, for shrubs.
- To Mr. T. Lewis, for shrubs.
- To Mr. W. C. Slocock, for shrubs.
- To Mr. C. Turner, for shrubs.
- To Messrs. W. Watson, for shrubs.
- To Messrs. R. Green, for Bay trees and palms.

*Silver Banksian Medal.*

- To Messrs. Harrods, for shrubs.

*Bronze Flora Medal.*

- To Mr. G. G. Whitelegg, for shrubs.

## HERBACEOUS PLANTS.

*Gold Medal.*

- To Messrs. Blackmore & Langdon, for Begonias.
- To Messrs. G. Bunyard, for Irises.
- To Messrs. J. Carter, for Cinerarias, etc.
- To Messrs. L. R. Russell, for stove and greenhouse plants.
- To Messrs. Sutton, for flowering plants.
- To Mr. H. J. Jones, for Hydrangeas.

*Silver Cup.*

- To Mr. Amos Perry, for ferns, herbaceous, etc.
- To Messrs. Webb, for mixed group.
- To H. B. Brandt, Esq. (gr. H. Cook), for Caladiums.

*Silver-gilt Flora Medal.*

- To Mr. F. G. Wood, for herbaceous plants, etc.
- To Messrs. Cutbush, for Hydrangeas.
- To Messrs. J. Waterer, Sons & Crisp, for herbaceous plants.

*Silver-gilt Banksian Medal.*

- To Mr. H. N. Ellison, for ferns.
- To Messrs. B. Ladhams, for hardy plants.
- To Messrs. J. Peed, for stove and greenhouse plants.
- To Messrs. M. Prichard, for herbaceous plants.
- To Mr. E. Scaplehorn, for herbaceous plants.
- To Messrs. Storrie & Storrie, for hardy plants.
- To Messrs. Watkins & Simpson, for Schizanthus.
- To Messrs. Wm. Artindale, for Calendula and Violas.
- To Messrs. Bees, for mixed plants.
- To Messrs. Blackmore & Langdon, for Delphiniums.
- To Messrs. Carter Page, for Dahlias.
- To Chalk Hill Nurseries, for mixed group.
- To Mr. A. Dawkins, for Schizanthus, etc.
- To Messrs. de Goede Bros., for Irises and Anemones.
- To Orpington Nurseries, for Irises.
- To Messrs. Toogood, for Irises and Tulips.

*Silver Flora Medal.*

- To Mr. H. Clarke, for Violas.
- To Messrs. Hewitt, for Delphiniums.
- To Messrs. Jarman, for Geraniums.
- To Maytham Gardens, for cut flowers.
- To Mr. G. A. Miller, for herbaceous and shrubs.
- To Mr. William Yandell, for Violas.
- To Messrs. Smail, for herbaceous and alpine plants.
- To Mr. W. Wells, jun., for herbaceous and alpine plants.

*Silver Banksian Medal.*

- To Mr. T. Carlile, for herbaceous.
- To Messrs. G. Gibson, for herbaceous.
- To Messrs. Godfrey, for Pelargoniums.
- To Messrs. Godfrey, for Schizanthus.
- To Maytham Gardens, for herbaceous and alpine.
- To Messrs. Reamsbottom, for St. Brigid Anemones.
- To Messrs. Rich, for hardy flowers.

*Bronze Flora Medal.*

- To Mr. R. J. Case, for Pelargoniums.
- To Messrs. J. Cheal, for Dahlias.

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MAY 29, 1925.

A Gold Banksian Medal was sent to the Shanghai Horticultural Society for award at their Jubilee Show on May 29, 1925.

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GENERAL MEETING.

JUNE 9, 1925.

Mr. W. A. BILNEY, V.M.H., in the Chair.

Three hundred and forty-two Fellows and ten Associates were elected, and four Societies affiliated.

A lecture on "Alpine Plants" by Mr. Clarence Elliott was read by Mr. A. Simmonds (see p. 44).

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GENERAL MEETING.

JUNE 23, 1925.

Dr. A. W. HILL, F.R.S., in the Chair.

Sixty-nine Fellows and one Associate were elected.

A Masters Memorial Lecture on "Problems of Vegetative Propagation" was given by Prof. J. H. Priestley (see p. 1).



## AMATEUR FLOWER SHOW.

JUNE 30, 1925.

## JUDGES.

BEAN, W. J., V.M.H.  
 CHAPLIN, W. E.  
 COUTTS, J.  
 EASLEA, W.  
 JORDAN, F.

MONRO, G.  
 NOTCUTT, R. C.  
 PAGE, W. H.  
 RUSSELL, L. R.

*List of Awards.*

## NON-COMPETITIVE GROUPS.

*Gold Medal.*

To Mr. W. B. Cranfield, for British ferns.  
 To Sir Jeremiah Colman, Bt., for Orchids.

*Silver-gilt Banksian Medal.*

To Major A. Pam, for Nymphaeas.  
 To Lt.-Col. L. C. R. Messel, for flowering shrubs.  
 To Mr. H. T. Pitt, for Orchids.  
 To Mr. R. Cory, for Cotyledons.  
 To Mr. R. O. Backhouse, for hybrid Lilies.

*Silver Banksian Medal.*

To Mr. Lionel de Rothschild, for flowering shrubs.  
 To Mr. J. S. Arkwright, for Lychnis.

*Vote of Thanks.*

To the Hon. Mrs. R. Talbot, for seedling Horse-chestnuts.

## CHIEF AWARDS IN COMPETITIVE CLASSES.

Class 1.—Twelve vases of Tea or Hybrid Tea Roses.

*First Prize, £5 ; Second, £3 ; Third, £2 ; Fourth, £1.*

1st. Mr. H. Wettern.  
 2nd. Mr. G. A. Hammond.  
 3rd. Mr. F. Evans.  
 4th. Mrs. E. R. Workman.

Class 7.—Twelve vases of Delphiniums.

*First Prize, £5 ; Second, £3.*

1st. Mr. H. K. Farnell.  
 2nd. Mr. F. C. Stoop.

Class 9.—Twelve vases of Sweet Peas.

*First Prize, £5 ; Second, £3 ; Third, £2.*

1st. Mr. R. H. Whitehead.  
 2nd. Mr. F. Churchward.  
 3rd. Mr. A. H. Tyler.

Class 14.—Twelve vases of cut sprays of shrubs in flower.

*First Prize, £5 and "Gardeners' Chronicle" Silver-gilt Medal ; Second, £3 ; Third, £2.*

1st. Mr. Lionel de Rothschild.  
 2nd. Lt.-Col. Stephenson Clarke.  
 3rd. Sir William Lawrence, Bt.

Class 16.—Twelve vases, containing cut flowers of herbaceous plants.

*First Prize, £5 ; Second, £3.*

1st. Mr. Lionel de Rothschild.  
 2nd. Mr. F. C. Stoop.

Class 18.—Twelve pot plants grown under glass.

*First Prize, £5 ; Second, £3.*

1st. Mr. A. P. Brandt.

2nd. Sir William Lawrence, Bt.

Class 21.—Twelve pots of Orchids.

*First Prize, £5.*

1st. Mr. H. T. Pitt.

Class 40.—Group of succulent plants.

*First Prize, £3.*

1st. Mr. R. Cory.

Class 41.—Group of flowering and foliage plants.

*First Prize, £5 ; Second, £3 ; Third, £2.*

1st. Mr. A. P. Brandt.

2nd. Mr. C. Longman.

3rd. Mr. E. R. Crick.

Class 42.—Best new plant introduced into this country since 1914.

*First Prize, Gold Medal ; Second, Silver-gilt Flora Medal.*

1st. Mr. L. de Rothschild.

2nd. Mr. F. C. Stern.

*Silver Cup presented by the Proprietors of " Amateur Gardening " for highest number of points gained by an Exhibitor.*

Awarded to Mr. A. T. Sutton, who gained 18 points.

## SCIENTIFIC COMMITTEE.

JANUARY 13, 1925.

MR. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, and ten other members present.

*Germination of Tulip seed.*—Mr. Worsley drew attention to the extremely rapid germination of Tulip seed after it had been exposed to frost, and some conversation took place relative to the probable cause of this phenomenon. The reason suggested is that the permeability of the walls of the cells (and possibly also of the protoplasmic lining) is altered by the low temperature, as it may be by high and by chemical action, and water is allowed to pass freely.

*Hybrid Mints.*—Mr. Fraser showed a dried specimen of a hybrid mint, the offspring probably of *Mentha alopecuroides* and *M. rotundifolia*, which grows very vigorously and may be as much as 4 feet in height. It is used at times for culinary purposes and is growing at Wisley. For comparison he showed the minute *M. Requeinii*.

*Rhododendron hybrids.*—Mr. McLaren's children showed an interesting series of dried leaves of *Rhododendrons* and their hybrids, comparing the shape, size, and tomentum of the one with the other.

*Iris germanica flowering.*—Col. Cuthbert James wrote concerning the flowering of the common blue flag at this season in his garden at Enfield. It had produced several spikes, and so had behaved like a good many spring flowering plants during the present abnormally wet season in flowering prematurely.

*American Mistletoe.*—Mr. Bowles exhibited a specimen of the American mistletoe, *Phoradendron flavescens*, from America, showing very numerous small berries and ovate leaves.

*Crocus forms.*—He also showed *Crocus Adami* of Gay—the bluest crocus in cultivation at the present time, sent home by Siehe; a *C. reticulatus* seedling approaching *C. candidus* in its corm tunic and possibly a hybrid with that species; *C. chrysanthus* 'Snow Bunting,' a seedling of *C. chrysanthus* of a beautiful soft shade of yellow, prettily marked.

*Chinese Gentians.*—Mr. Chittenden showed a series of dried plants of *Gentians* collected in West China by Mr. Forrest, many of which are desirable as garden plants, but have not yet been introduced.

SCIENTIFIC COMMITTEE, JANUARY 27, 1925.

MR. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, and twelve other members present.

*Phosphorescent wood.*—Mr. C. G. A. Nix showed a piece of decayed wood which at night glowed with phosphorescent light, found at Crawley, Sussex.

*British plants.*—Mr. Fraser showed specimens of *Gladiolus illyricus* from the New Forest and of *Juncus acutus*, the largest British rush.

*Cyrtanthus from E. Africa.*—Mr. Van de Weyer showed flowering specimens of a *Cyrtanthus* from East Africa allied to *C. sanguineus*.

*Fruit of Euonymus.*—Mr. Bowles showed fruit and foliage of *Euonymus alatus* from Westonbirt, and remarked that this plant was entirely different from the species Farrer had collected and which had been referred to *E. alatus*.

*Power of growth.*—A large iron cup from the basement of the Hall, weighing 11 lb., was exhibited, together with a mushroom (*Agaricus campestris*) which had lifted it completely out of its place.

*Sparmannia africana.*—A specimen of *Sparmannia africana* in flower was exhibited from a garden near Dublin, where it was growing in the open. This African plant is nearly hardy, and will flower outdoors in many winters in south-western England.

*Crocuses.*—Mr. Bowles showed a *Crocus* called 'Grey Wagtail,' with the shape and markings of *Crocus aerius* but with the black barb to the anther typical of *C. chrysanthus*, of which it is probably a hybrid. He also showed the *C. chrysanthus* form called 'Bumble Bee,' with purple suffused over the whole of the backs of the outer segments.

SCIENTIFIC COMMITTEE, FEBRUARY 10, 1925.

Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, and eleven other members present.

*Mentha hybrid sporting*.—Mr. J. Fraser showed dried specimens of *Mentha rotundifolia*  $\times$  *viridis* (*M.*  $\times$  *spicata*) and remarked that it had recently sported to a narrow-leaved form of the *viridis* type—apparently a case of somatic segregation.

*Arsenate of lead poisoning*.—Dr. Voelcker reported the result of a recent case where arsenate of lead poisoning was alleged to have caused the death of cattle after spraying operations had been carried out. The case was lost, but apparently owing to lack of proof of arsenic poisoning rather than from proof of innocuousness of grass wetted with the lead arsenate.

*Various plants*.—Mr. Van de Weyer showed *Narcissus Tazetta* in two forms, one with small scentless flowers, the other with larger scented ones; *N. Bulbocodium nivalis*, *N. Bulbocodium* type, and a large green striped form of the same species, and *Ornithogalum uniflorum*.

Mr. Preston showed, from the Cambridge Botanic Garden, *Prunus Pseudo-cerasus*, *Symplocarpus foetidus* and *Stiffia chrysantha*, a curious Peruvian composite. To the last plant, on the motion of Mr. Hales, seconded by Dr. Hill, a Botanical Certificate was recommended.

Mr. Cory sent *Pyracantha linifolia*, a species from China nearly related to *P. angustifolia*.

*Droppers of Gladiolus*.—Mr. Chittenden showed *Gladiolus psittacinus* with small corms produced at the ends of three inch-long stolons.

*Crocuses*.—Mr. Bowles showed several Crocuses, including *C. biflorus Weldenii* and dark forms from seed, some of which were now showing a blue ground. He also showed hybrids between this and *C. chrysanthus* and others probably between *C. chrysanthus* and *C. aeneus*, *C. aureus* with bronzy colouring on outer segments, and various other colour variations in different Crocus species.

SCIENTIFIC COMMITTEE, FEBRUARY 24, 1925.

Sir DAVID PRAIN, F.R.S., in the Chair, eleven other members and Rev. J. JACOB (visitor) present.

*Pyrolas*.—Mr. Fraser showed some beautifully preserved specimens of *Pyrolas* from British localities, including *P. minor* from Surrey, remarking upon the extreme difference in its habitats there so far as moisture is concerned, and expressing the opinion that shade was its first requirement, *P. rotundifolia* from near Liverpool, and *P. secunda* from Killin.

*Kitchingia uniflora*.—Mr. Preston showed a finely flowered specimen of this uncommon plant from a cold succulent house.

"Silverleaf" in *Rhododendron*.—Mr. A. D. Cotton showed specimens of the stem of *Rhododendron barbatum* from Kew, bearing fructifications of the fungus *Stereum purpureum*. The attack is not characterized in the *Rhododendron* by any silvering of the foliage, but the attacked stem is killed and the characteristic brown stain is produced in the wood invaded by the fungus. So far only *R. barbatum* and *R. Griffithianum* have been attacked.

*Freeseias*.—Mr. Jacob exhibited a series of his seedling *Freeseias*, and Mr. Bowles remarked that Mr. Jacob's seedlings were an advance upon most others in the open flattened form of the flower. Mr. Bowles proposed, and Mr. Preston seconded, and it was carried *nem. con.*, that a Certificate of Appreciation should be given to Mr. Jacob for his work in improving *Freeseias*.

*Japanese Cherries*.—The Chairman read a letter from Lady Harmer referring to Mr. Collingwood Ingram's article in the last JOURNAL of the Society and advocating the planting of Japanese Cherries at Wembley. This letter was referred to the Council for sympathetic consideration.

SCIENTIFIC COMMITTEE, MARCH 10, 1925.

Sir DAVID PRAIN, F.R.S., in the Chair, nine other members and Mr. VAN DE WEYER (visitor) present.

*Rose hybrid*.—Mr. Fraser showed a dried specimen of a unique rose hybrid collected in Scotland and named by Col. Wolley Dod *R. x Barclayi*, a hybrid between *Rosa spinosissima* and *R. omissa*. Mr. Hanbury said that he had found

a very beautiful hybrid of *R. spinosissima* and *R. mollis* on the sandhills at Naver, which he had now growing in his garden.

*Cinerarias*.—Mr. Preston showed *Cineraria Heritieri* and a seedling of it called 'Beauty of Cambridge,' which unlike the parent flowered for five months or so in winter. Mr. Preston had last year raised seedlings from this usually sterile form, all of which had produced flower heads without ray florets. The capitula had not yet been thoroughly examined.

*Fruits of Columnea flava*.—Mr. Preston also showed fruiting sprays of *Columnea flava* bearing white berries, a very pleasing contrast with the growths.

*Terrestrial orchids*.—Mr. Van de Weyer showed two orchids collected in Portugal which were so far unnamed, but which were very similar to the group known in Southern France under the name *Ophrys insectifera*.

*Craterostigma plantagineum*.—He also showed plants of *Craterostigma plantagineum* grown from seed collected on Mount Kenya at an elevation of 5,000 ft. The plant grows flat on the rocks. It is a Schophulariad with a remarkable resemblance to a violet in the flower and to a Gesneriad in foliage. On the motion of Mr. Bowles, seconded by Mr. Hales, a Botanical Certificate was unanimously awarded to this plant.

## SCIENTIFIC COMMITTEE, MARCH 24, 1925.

Mr. E. A. BOWLES, M.A., V.M.H., in the Chair, and nine other members present.

*Saxifraga oppositifolia*.—Mr. Fraser showed dried specimens of *Saxifraga oppositifolia*, and remarked that this plant as seen in Perthshire showed a great deal of variation. The petals were at times narrow, at times broad. The Chairman remarked that most of the best forms grown in gardens came from the Pyrenees, those of Central Europe being generally poor.

*Anagallis tenella*.—Mr. Fraser also showed specimens of *Anagallis tenella* very freely flowered. This is a delicate little flower, usually almost lost to sight among the grasses in which it grows, but sometimes conspicuous in moist places.

*Disease of Thuya*.—Mr. Cotton showed an example of the attack of the fungus *Keithia thuina* upon seedling *Thuya plicata* from a nursery in Dorsetshire. The shoots which are attacked die and wither up, and the fungus appears able to cause very considerable damage in the nursery. It was first recorded from Ireland and from Leonardslee in 1919, and is so far known only to attack Thuyas in the seedling stages.

## SCIENTIFIC COMMITTEE, APRIL 7, 1925.

Sir DAVID PRAIN, F.R.S., in the Chair, and seven other members present.

*Spiraea Ulmaria*.—Mr. J. Fraser showed dried specimens of *Spiraea Ulmaria* to illustrate the different degrees of hairiness of foliage found in this plant, especially as regards the lower surface. He suggested that these differences might adapt the plant for growing in different environments, but he had not been able certainly to correlate the differences with the environments.

*Rubus laciniatus*.—Mr. Fraser also showed seedlings of *Rubus laciniatus* to draw attention to the fact that seedlings of this plant often come true to the laciniate character of the foliage. He had found it occurring apparently wild at Esher.

*Fasciated Iris Xiphium*.—Mr. H. G. Jalland sent an example of *Iris Xiphium* in which two flowers had apparently failed to separate, both having opened.

## SCIENTIFIC COMMITTEE, APRIL 21, 1925.

Mr. E. A. BOWLES, M.A., V.M.H., in the Chair, and nine other members present.

*Willows*.—Mr. Fraser showed dried specimens of *Salix cinerea* × *viminalis*, and remarked upon the variation seen in the foliage of this hybrid, and also *S. aurita* × *S. viminalis* from Surrey and the shores of Moray Firth. The latter appears also to be a variable hybrid of which silky foliage is typical.

*Primrose with enation on petals*.—Mr. Jones showed a primrose with a growth from the midrib of each petal at the throat. The stamens were perfect and the enation was probably of the nature of a crest (see p. xxxiv).

*Matthiola incana*.—Mr. Jones also showed a flowering plant of *M. incana* grown from seed collected in the Isle of Wight. It had proved perennial in his garden.

*Swelling on horse-chestnut stem*.—Mr. Chas. Lucas sent a branch of horse-chestnut with a large swelling round an old wound made in all probability by a boring caterpillar, the growth having been set up by the irritation caused by the wound.

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SCIENTIFIC COMMITTEE, MAY 5, 1925.

Sir DAVID PRAIN, F.R.S., in the Chair, and eight other members present.

*Varieties of Artichoke*.—Mr. Fraser showed a variety of Jerusalem Artichoke which he characterized as new and as introduced by Messrs. Vilmorin, having fusiform roots, the particular advantage of it being that it was easier to peel than the common one. The Chairman pointed out that the variety had been known for over two hundred years, being described in the middle of the seventeenth century. The plant was introduced to gardens about 1615, and in 1650 colour varieties were described, showing that, at any rate in France, seed had ripened and seedlings had been raised. He gave many interesting details of the cultural history of the plant.

*Various plants*.—Mr. Van de Weyer showed a small Campanulaceous plant the seed of which he had collected in Kenya, having somewhat irregular purplish flowers, and apparently a *Lobelia*, which Mr. Cotton took for further examination. He also showed *Saxifraga Sibthorpii* for naming.

Mr. Hosking showed *Uropetalum* sp. and *Arctotis calendulacea*.

*Primrose with enations*.—Dr. Bateson remarked that examination of the Primrose having enations from the middle of each petal, shown by Mr. Marsden Jones at the last meeting, left practically no doubt that the enations are comparable with those of the "new double" in *Primula sinensis*. That is to say the adjacent surfaces are homologous. The phenomenon is therefore quite different from the creasing of Cyclamen. He had no knowledge of any previous example of doubling which is comparable with the new double in *P. sinensis*, so that the case is interesting. He had seen something like it in leaves but not in petals. Mr. Jones had found two somewhat similar plants, one in a friend's garden, the other in a wood about two miles away.

*Bare patches on turf*.—Dr. Voelcker showed a piece of turf from which the grass had died. He had examined the soil chemically and could find no explanation of the failure, and it was suggested that possibly the growth of an alga such as *Nostoc* had caused the suffocation of the grass.

*Monstrous daisies*.—Mr. Hay sent a number of fasciated heads of double daisies of a Belgian strain measuring several inches in diameter, and pointed out that the central flower head in every case was fasciated.

*Cytinus hypocistis*.—Mr. Chittenden showed an example of this curious parasite which was found growing on *Cistus* sp. in Corsica.

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SCIENTIFIC COMMITTEE, JUNE 9, 1925.

Sir DAVID PRAIN, F.R.S., in the Chair, eleven other members and Messrs. VAN DE WEYER, CLEMENS, and ARMSTRONG (visitors) present.

*Sarmienta repens*.—Mr. Preston showed a plant of the Chilean *Sarmienta repens* grown in the Cambridge Botanic Garden in a basket in a cool house. High temperatures do not suit it.

*Fungus flora of the Downs*.—Mr. A. D. Cotton showed the rust fungus *Gymnosporangium* on hawthorn from the Wiltshire Downs. The alternate host is the Juniper, in the tissues of which the fungus is perennial. He also showed rust on *Poterium Sanguisorba*, *Phyllacora trifolii* on *Trifolium incarnatum*, a small unidentified *Peziza* from the bare chalk, *Puccinia luti*, which probably passes from grass host to grass host without its intervening host, *Aquilegia*, *Epichloë graminis*.

*Plants from the Downs*.—Mr. Jones showed from the same locality *Orchis ustulata*, *Habenaria viridis*, *Ophrys muscifera*, *O. apifera*, *Habenaria bifolia*, *Cephalanthera grandiflora*, *Orchis Morio*, *O. maculata*, *Listera ovata*, *Habenaria conopsea*, *Neottia Nidus-avis*, *Euonymus europaeus*, *Juniperus communis*, *Hippocrepis comosa*, *Polygala calcarea*, *Saxifraga granulata*, *Senecio integrifolius*, *Gentiana ligulata praecox*, *Ophioglossum vulgatum*.

*Hybrid Buddleias*.—Mr. Van de Weyer showed hybrid *Buddleias* and a curious perverted form of *Buddleia globosa* with narrow leaves and small flowers, seedlings of which come like the parent.

*Orchid seed raising*.—Mr. Clement, introduced by Mr. Wilson, showed several tubes of an agar medium on which orchid seeds, *Cattleyas*, *Odontoglossums*, etc., were germinating without the presence of a fungus. He expressed the opinion that the seeds required larger supplies of organic food than are present in them, otherwise germination is interfered with. This, he stated, was supplied in the tubes, but he did not reveal the nature of the food supplied, or its quantity. Mr. Wilson proposed, and Mr. Hales seconded, that a Certificate of Appreciation should be recommended to Mr. Clement. This was carried.

*Various plants*.—Mr. Fraser showed a proliferated Pot Marigold, *Malaxis paludosa* and *Listera cordata*.

*Fasciated Cotoneaster*.—Mr. Notcutt sent a fasciated specimen of *Cotoneaster horizontalis*.

*Chelsea Show exhibits*.—Mr. Hales remarked that it would add interest to the exhibits in the Information Tent if plants of botanical interest could be collected there; and he and others drew attention to the fact that tickets issued to members of Committees admitting to Chelsea Show at an early hour were not issued to the Scientific Committee.

#### SCIENTIFIC COMMITTEE, JUNE 23, 1925.

Mr. E. A. BOWLES, M.A., V.M.H., in the Chair, and seven other members present.

*Aerial bulbs*.—Mr. Hales showed Darwin tulips with bulbs formed in the axils of the foliage leaves.

*British Orchids*.—Mr. Fraser exhibited dried specimens of *Orchis incarnata* and its varieties *pulchella* and *angustifolia*, *O. praetermissa* of Druce, *O. maculata* and its varieties, *ericetorum* and *alba*.

*Raspberry with simple leaves*.—Mr. Van de Weyer brought a form of the wild Raspberry with simple leaves, collected at Hungerford, which he stated so far had proved to be sterile. He also showed *Heliotropium anchusaeifolium* which had appeared as a weed in his garden.

*Tulip with floral leaves on stem*.—Mr. Jeffers sent Tulips ('Belle Alliance') with abnormal flowers.

*Californian plants*.—Mr. Hay showed *Antirrhinum Coulterianum* with branch tendrils in the leaf axils, *Gilia abrotanifolia*, *Armeria allioides*, *Mimulus Fremontii*, and *Malacothrix californica*.

*Time of Lectures*.—Dr. Voelcker raised the question of the time of the afternoon Lecture, stating it was impossible for members of the Scientific Committee to be present at the Lectures when held at the same time as the Scientific Committee's meetings, and instanced the importance of the Masters Lecture then in progress to members of the Scientific Committee, and at which many would have been present if it had been held at an earlier hour. He moved a resolution, which was carried, asking if the Council could consider the possibility of reverting to the former hour of 3 o'clock for the Lecture.

# FRUIT AND VEGETABLE COMMITTEE.

JANUARY 13, 1925.

Mr. C. G. A. Nix, V.M.H., in the Chair, and seventeen other members present.

## Awards Recommended :—

*Gold Medal.*

To Messrs. Sutton, Reading, for collection of vegetables.

*Silver-gilt Hogg Medal.*

To Messrs. Bunyard, Maidstone, for collection of Apples and Pears.

To Cecil Hanbury, Esq., M.P. (gr. Mr. Braggins), La Mortola, Italy, for collection of Citrus Fruits.

## Other Exhibits.

Mr. D. Mountfield, Horsford : seedling Apple.

The Hon. Vicary Gibbs, Aldenham : Chicory ' Venetian variegated.'

Mrs. Miller, Marlow : preserves.

Miss H. G. Sewell, South Kensington : preserves.

Messrs. Westmacott, Charing Cross : South African preserves.

FRUIT AND VEGETABLE COMMITTEE, JANUARY 27, 1925.

Mr. C. G. A. Nix, V.M.H., in the Chair, and twelve other members present.

## Award Recommended :—

*Gold Medal.*

To Mr. J. C. Allgrove, Langley, for collection of Apples and Pears.

## Other Exhibits.

Messrs. Waterer, Sons & Crisp, Twyford : Apple ' John Waterer.'

Pickering Cottage Preserves, Maidstone : preserves.

Mrs. Miller, Marlow : preserves.

Miss H. G. Sewell, South Kensington : preserves.

Messrs. Westmacott, Charing Cross : South African preserves.

FRUIT AND VEGETABLE COMMITTEE, FEBRUARY 10, 1925.

Mr. C. G. A. Nix, V.M.H., in the Chair, and seventeen other members present.

## Awards Recommended :—

*Silver-gilt Hogg Medal.*

To Messrs. Bunyard, Maidstone, for Apples and Pears.

To Messrs. Rivers, Sawbridgeworth, for citrus fruits.

*Silver-gilt Knightian Medal.*

To Messrs. Sutton, Reading, for collection of vegetables.

*Silver Knightian Medal.*

To Messrs. Dobbie, Edinburgh, for collection of vegetables.

## Other Exhibits.

French Intensive Gardens, Croydon : *Dioscorea Bataias* and ' Chappelier's Improved.'

Colonel A. S. Bates, Basingstoke : Oranges.



## FRUIT AND VEGETABLE COMMITTEE, FEBRUARY 24, 1925.

Mr. C. G. A. NIX, V.M.H., in the Chair, and eighteen other members present.

No awards were recommended on this occasion.

**Exhibits.**

Messrs. Westmacott, Charing Cross : South African fruit.

The recommendations made by the Sub-Committee visiting Wisley to judge the trials of Lettuce under glass, the Broccoli, and Kales, were confirmed.

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## FRUIT AND VEGETABLE COMMITTEE, MARCH 10, 1925.

Mr. J. CHEAL, V.M.H., in the Chair, and thirteen other members present.

No awards were recommended on this occasion.

**Exhibits.**

Messrs. Bunyard, Maidstone : collection of Apples in season.

Mr. G. Hills, Ash : seedling Apple.

Mr. H. Jones, Letchworth : Apple 'Smiling Morn.'

Mrs. P. Martineau, Sunningdale : King Tangerine Orange.

Messrs. Westmacott, Charing Cross : South African fruits.

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## FRUIT AND VEGETABLE COMMITTEE, MARCH 24, 1925.

Mr. A. H. PEARSON, J.P., V.M.H., in the Chair, and twelve other members present.

No awards were recommended on this occasion.

**Exhibits.**

Messrs. Bunyard, Maidstone : collection of Apples in season.

Messrs. Westmacott, Charing Cross : South African fruit.

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## FRUIT AND VEGETABLE COMMITTEE, APRIL 7, 1925.

Mr. C. G. A. NIX, V.M.H., in the Chair, and sixteen other members present.

No awards were recommended on this occasion.

**Exhibits.**

Messrs. Bunyard, Maidstone : collection of Apples in season.

R. B. Rogers, Esq., Launceston ; Cydonia fruit (4120 Wilson).

Messrs. J. & A. H. Crock, Beaconsfield : Apples.

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1925.

The following awards have been made to Kales by the Council of the Royal Horticultural Society after trial at Wisley :—

*Award of Merit.*

1. 'Limpsfield Greens,' sent by Mr. H. Roberts, Oxted.
5. 'New Sprouting,' sent by Messrs. Barr, London.

*Highly Commended.*

11. 'New Labrador,' sent by Messrs. Barr, London.

1925.

The following awards have been made by the Council of the Royal Horticultural Society to Broccoli Sprouting, after trial at Wisley:—

*Award of Merit.*

205, 206. 'Christmas Purple Sprouting,' sent by Messrs. Barr, London; Messrs. W. H. Simpson, Birmingham.

*Highly Commended.*

203. 'White Sprouting,' sent by Messrs. Dobbie, Edinburgh.

1925.

The following awards have been made to Lettuce under Glass by the Council of the Royal Horticultural Society, after trial at Wisley:—

*First-class Certificate.*

- { 96. 'Hothouse Premier,' sent by Messrs. Zwaan & de Wiljes, Scheemda, Holland.
- { 97. 'Primus Nunhem,' sent by Messrs. Nunhem, Limburg.
- { 98. 'Primus,' sent by Messrs. Sluis & Groot, Enkhuizen.
- { 99. 'Early French Frame,' sent by Messrs. Nutting, London.
- { 101. 'Early French Frame,' sent by Messrs. Watkins & Simpson, London.
- { 102. 'Gotte à graine noire,' sent by Messrs. Vilmorin, Paris.

*Award of Merit.*

- { 46. 'Golden Ball Forcing,' sent by Messrs. J. L. Clucas, Ormskirk.
- { 47. 'Golden Queen,' sent by Messrs. Nutting, London.
- { 48. 'Golden Queen,' sent by Messrs. Carter, Raynes Park.
- { 50. 'Early Frame,' sent by Messrs. Dicksons, Chester.
- { 58. 'Golden Stonehead,' sent by Messrs. Zwaan & de Wiljes.
- { 56. 'Bottners' Forcing,' sent by Messrs. Zwaan & de Wiljes.
- { 59. 'Dutch Forcing,' sent by Messrs. Carter.

85, 89, 91. 'Tom Thumb' { sent by Messrs. Kelway, Langport.  
 sent by Messrs. Toogood, Southampton.  
 sent by Messrs. Carter, Raynes Park.  
 sent by Messrs. Cooper-Taber, London.  
 sent by Mr. R. Veitch, Exeter.  
 sent by Messrs. Morse, San Francisco

*Highly Commended.*

- 4. 'Early White Spring,' sent by Messrs. Carter.
- 10. 'Early Paris Market,' sent by Messrs. Kelway, Langport.
- 11. 'Early Paris Market Forcing,' sent by Messrs. Barr, London.
- 38. 'Magnet,' sent by Messrs. Webb, Stourbridge.
- 43. 'Little Gem,' sent by Messrs. Barr, London.
- 84. 'Commodore Nutt,' sent by Messrs. Sutton, Reading.
- 94. 'Kardezen,' sent by Messrs. Spruijt, Utrecht.
- 103. 'Gotte à Chassis,' sent by Messrs. Vilmorin, Paris.

*Commended.*

65. 'Delicacy,' sent by Messrs. Webb, Stourbridge.

FRUIT AND VEGETABLE COMMITTEE, APRIL 21, 1925.

Mr. C. G. A. NIX, V.M.H., in the Chair, and thirteen other members present.

No awards were recommended on this occasion.

*Exhibits.*

Messrs. Bunyard, Maidstone: collection of Apples and Pears in season.

Messrs. Westmacott, Charing Cross: Cape fruits.

Mr. Woodward, Maidstone: Pear 'Doyenne Georges Boucher,' and Apple 'Optien d'Hiver.'

FRUIT AND VEGETABLE COMMITTEE, MAY 5, 1925.

AT CHELSEA.

Mr. A. H. PEARSON, J.P., V.M.H., in the Chair, and fifteen other members present.

No awards were recommended on this occasion.

**Exhibit.**

Messrs. G. E. Hudson, Dowgate Hill, E.C. 4 : South African Pears for opinion.

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FRUIT AND VEGETABLE COMMITTEE, JUNE 9, 1925.

Mr. C. G. A. NIX, V.M.H., in the Chair, and eight other members present.

There was no business before the Committee on this occasion.

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FRUIT AND VEGETABLE COMMITTEE, JUNE 23, 1925.

Mr. C. G. A. NIX, V.M.H., in the Chair, and ten other members present.

**Awards Recommended :—**

*Silver Hogg Medal.*

To Messrs. Laxton, Bedford, for Strawberries.

*Silver Bunyard Medal.*

To J. A. Nix, Esq. (gr. Mr. E. Neal), Tilgate, Crawley, for Strawberries.

The recommendations made by the sub-committee visiting Wisley to judge the trial of Early Peas were confirmed.

FLORAL COMMITTEE.

JANUARY 13, 1925.

Section A.

Mr. H. B. MAY, V.M.H., in the Chair, and fourteen other members present.

Awards Recommended :—

*Silver-gilt Banksian Medal.*

To Messrs. Allwood, Haywards Heath, for Carnations.

*Silver Banksian Medal.*

To Mr. J. W. Forsyth, Putteridge, for Cyclamen.

To Messrs. S. Low, Enfield, for Carnations and other greenhouse plants.

To Messrs. Russell, Richmond, for *Pycnostachys Dawei* and other greenhouse plants.

*Bronze Banksian Medal.*

To Messrs. Carter, Raynes Park, for *Iris tingitana*.

To Mr. C. Engelmann, Saffron Walden, for Carnations.

To Mr. E. J. Hicks, Hurst, for Roses.

*Award of Merit.*

To *Primula malacoides* 'Courtlands Seedling' (votes 9 for), from P. W. Carver, Esq., West Hoathly. A very vigorous and distinct variety of this well-known greenhouse *Primula*. It has large lilac-pink flowers and is very free flowering in habit. The original plant came up several years ago amongst a batch of seedlings of the typical *P. malacoides*.

Other Exhibits.

Mr. G. Carpenter, Byfleet : Carnation 'Hercules.'

Misses Hopkins, Shepperton : hardy plants.

W. Van de Weyer, Esq., Dorchester : Freesia 'White Pearl.'

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Section B.

Mr. G. W. E. LODER in the Chair, and fourteen other members present.

Awards Recommended :—

*Silver Banksian Medal.*

To Messrs. Cutbush, Barnet, for rock garden.

To Master Charles and Miss Betty McLaren, Tal-y-cafn, for a collection of *Rhododendron* leaves. (Special congratulations.)

To Messrs. Waterer, Sons & Crisp, Twyford, for shrubs and alpine.

*Bronze Banksian Medal.*

To Messrs. Cheal, Crawley, for conifers and alpine.

To Mr. G. Reuthe, Keston, for shrubs and alpine.

*First-class Certificate.*

To *Crocus chrysanthus* 'Snow Bunting' (votes unanimous), from E. A. Bowles, Esq., Waltham Cross. A very pretty early-flowering variety having the inner surface of the segments creamy-white, shading to deep amber at the base. On the outside of the segments there are slaty lines and blotches, while the conspicuous stigmata are bright orange-scarlet.

*Award of Merit.*

To *Pycnostachys Dawei* (votes unanimous), from Messrs. Russell, Richmond. This uncommon greenhouse plant is a native of Uganda, and seeds of it were first

sent to this country in 1905 by Mr. M. T. Dawe. The plant is of loosely branched pyramidal habit and grows about 4 to 6 feet high. Its leaves are narrowly lanceolate, acuminate and serrate. The deep blue flowers are borne in whorls in dense terminal spikes.

#### Other Exhibit.

Messrs. Carter Page, London : shrubs and alpinas.

### FLORAL COMMITTEE, JANUARY 27, 1925.

#### Section A.

Mr. H. B. MAY, V.M.H., in the Chair, and fourteen other members present.

#### Awards Recommended :—

##### *Gold Medal.*

To Messrs. Sutton, Reading, for forced bulbs.

##### *Silver-gilt Banksian Medal.*

To Messrs. Carter, Raynes Park, for Primulas.

##### *Silver Banksian Medal.*

To Messrs. Allwood, Haywards Heath, for Carnations.

To Mr. Forsyth, Putteridge, for Cyclamen.

To Messrs. Low, Enfield, for Carnations and other greenhouse plants.

To Messrs. Russell, Richmond, for greenhouse plants.

##### *Bronze Banksian Medal.*

To Mr. C. Engelmann, Saffron Walden, for Carnations.

To Mr. E. J. Hicks, Hurst, for Roses.

##### *Award of Merit.*

To Carnation 'Hercules' (votes unanimous), from Mr. G. Carpenter, Byfleet. A good scarlet perpetual-flowering variety of excellent form and medium size. It was raised by the exhibitor and is a very strong grower.

To Iris 'Wedgwood' (votes unanimous), from Messrs. Lowe & Shawyer, Uxbridge. This beautiful Iris is of Dutch origin, having been raised by the exhibitors and Messrs. van Waveren. It is the result of a cross between *I. tingitana* and an early-flowering form of *I. Xiphium*, known in the trade as *I. filifolia*. The growth is very strong, and about 2 to 2½ feet high. The flowers are large and pale blue, with golden markings on the falls. It is an excellent variety for market purposes, flowering 6 to 8 weeks earlier than any other similar Iris except *I. tingitana*. It stands mild forcing well, and gives a wonderful crop of flowers.

#### Other Exhibits.

Misses Hopkins, Shepperton : hardy plants.

Messrs. Reamsbottom, West Drayton : Anemones.

W. Van de Weyer, Esq., Dorchester : Freesia 'White Pearl.'

#### Section B.

Mr. G. W. E. LODGE in the Chair, and thirteen other members present.

#### Awards Recommended :—

##### *Silver Banksian Medal.*

To Messrs. Cutbush, Barnet, for shrubs and alpinas.

To Mr. G. Renthe, Keston, for shrubs and alpinas.

To Messrs. Barr, Taplow, for shrubs and alpinas.

To Messrs. Waterer, Sons & Crisp, Twyford, for shrubs and alpinas.

##### *Bronze Banksian Medal.*

To Mr. F. G. Wood, Ashted, for shrubs and alpinas.

To Messrs. Carter Page, London, for shrubs and alpinas.

To Messrs. Gill, Falmouth, for Rhododendrons, etc.

To Orpington Nurseries, Orpington, for shrubs.

To Messrs. Cheal, Crawley, for shrubs and alpinas.

### Award of Merit.

To *Crocus chrysanthus* 'Bumble-bee' (votes unanimous), from E. A. Bowles, Esq., M.A., Waltham Cross. This charming and appropriately named *Crocus* was raised by the exhibitor. The flowers are somewhat small, with the outer segments yellow inside and suffused with brownish-purple on the outside. The inner segments are pale yellow.

### Other Exhibits.

Messrs. Baker, Codsall: shrubs and alpinas.

G. P. Baker, Esq., Bexley: *Helleborus antiquorum*.

Mrs. Robert J. Hanbury, Poolewe: flowering shrubs grown in the open in Ross-shire.

Messrs. Skelton & Kirby, Pirbright: alpinas.

W. Van de Weyer, Esq., Dorchester: *Cotyledon Barbeyi* from Kenya Colony.

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FLORAL COMMITTEE, FEBRUARY 10, 1925.

### Section A.

Mr. H. B. MAY, V.M.H., in the Chair, and sixteen other members present.

### Awards Recommended:—

#### Silver-gilt Banksian Medal.

To Mr. J. W. Forsyth, Putteridge, for Cyclamen.

#### Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Mr. E. J. Hicks, Hurst, for Roses.

To Messrs. Russell, Richmond, for stove plants.

To Messrs. S. Low, Enfield, for Carnations and other greenhouse plants.

#### Bronze Banksian Medal.

To Mr. C. Engelmann, Saffron Walden, for Carnations.

To Mr. G. A. Miller, Wisbech, for Polyanthus.

To Miss Heathcote, Williton, for Violets.

To Mr. G. Prince, Longworth, for Roses.

### Award of Merit.

To *Freesia* 'Lemon Queen' (votes 14 for), from Rev. J. Jacob, Whitchurch. A very distinct and sweetly-scented variety of extra free flowering habit. It was raised by the exhibitor and bears large flowers of good substance. The colour is lemon-yellow, slightly deeper at the edges.

To *Freesia* 'Orange King' (votes 14 for), from Rev. J. Jacob, Whitchurch. Another of Mr. Jacob's seedlings with large deep orange flowers with faint brownish lines down the lower segments. It is very sweetly scented, free-flowering, and probably the deepest variety of its colour yet raised.

### Other Exhibits.

Misses Allen-Brown, Henfield: Violets.

Misses Hopkins, Shepperton: hardy plants.

Messrs. Lowe & Shawyer, Uxbridge: *Iris* 'Wedgwood.'

Mr. H. Miles, London: *Gerbera jamesonii* fl. pl.

Messrs. Reamsbottom, West Drayton: Anemones.

W. Van de Weyer, Esq., Dorchester: *Freesia* 'White Pearl.'

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### Section B.

Mr. G. W. E. LODER in the Chair, and eighteen other members present.

### Awards Recommended:—

#### Silver Banksian Medal.

To Messrs. Cheal, Crawley, for rock garden.

To Messrs. Cutbush, Barnet, for rock garden and shrubs.

To Messrs. Gill, Falmouth, for Rhododendrons.

To Mr. H. Hemsley, Crawley, for shrubs and alpinas.

To Rev. H. Rollo Meyer, Watton, for *Iris reticulata* and *I. 'Cantab.'*  
 To Mr. G. Reuthe, Keston, for shrubs and alpine.  
 To Messrs. Tucker, Oxford, for alpine.  
 To Messrs. Waterer, Sons & Crisp, Twyford, for shrubs and alpine.  
 To Mr. G. G. Whitelegg, Chislehurst, for shrubs and alpine.

*Silver Lindley Medal.*

To E. A. Bowles, Esq., M.A., V.M.H., for seedling Crocuses.

*Bronze Banksian Medal.*

To Messrs. Baker, Codsall, for shrubs and alpine.  
 To Messrs. Barr, Taplow, for shrubs and alpine.  
 To Messrs. Carter Page, London, for shrubs and alpine.  
 To Messrs. Prichard, Christchurch, for alpine.  
 To Messrs. Skelton & Kirby, for shrubs.  
 To Mr. F. G. Wood, Ashted, for shrubs and alpine.

*First-class Certificate.*

To *Prunus Amygdalus praecox* (votes 8 for, 3 against), from the Royal Botanic Gardens, Kew. This beautiful Almond flowers a fortnight earlier than the type, and is especially valued on this account. The flowers are large, measuring from 1 to 2 inches across, and vary in colour from rose to nearly white.

*Award of Merit.*

To *Galanthus byzantinus* (votes unanimous), from C. T. Musgrave, Esq. Godalming. This handsome Snowdrop is intermediate between *G. Elwesii* and *G. plicatus*. It has very large broad leaves, and its large, graceful, drooping flowers are borne on long stems.

To *Prunus Pseudocerasus* (votes unanimous), from the Cambridge Botanic Garden. This interesting Cherry, first described by Lindley in 1826, is now very rare in cultivation. The flowers measure about  $\frac{3}{4}$ -inch across, and are white tinged with rose. They are borne in characteristic short racemes.

To *Salix cinerea Medemii* (votes unanimous), from the Royal Botanic Gardens, Kew. A very handsome variety of the Grey Willow. Its large greenish catkins are very silky and are produced earlier than those of the type.

**Other Exhibits.**

Cambridge Botanic Garden: *Stiffia chrysantha*, passed to Scientific Committee with recommendation for Botanical Certificate.

R. Cory, Esq., Cardiff: *Pyracantha linifolia*.

Mr. Klinkert, Richmond: clipped Box trees.

Royal Botanic Gardens, Kew: *Pinus Sabiniana* with large, heavy cones.

Messrs. Sheppard, Birmingham: shrubs and alpine.

FLORAL COMMITTEE, FEBRUARY 24, 1925.

*Section A.*

Mr. H. B. MAY, V.M.H., in the Chair, and seventeen other members present.

**Awards Recommended :—**

*Gold Medal.*

To Messrs. Sutton, Reading, for Cyclamen.

*Silver-gilt Banksian Medal.*

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. Carter, Raynes Park, for Crocuses.

To Mr. J. W. Forsyth, Putteridge, for Cyclamen.

*Silver Banksian Medal.*

To Mr. C. Engelmann, Saffron Walden, for Carnations.

To Mr. E. J. Hicks, Hurst, for Roses.

*Bronze Banksian Medal.*

- To Miss Heathcote, Williton, for Violets.
- To Mr. J. J. Kettle, Corfe Mullen, for Violets.
- To Messrs. S. Low, Enfield, for Carnations and other greenhouse plants.
- To Mr. G. A. Miller, Wisbech, for Polyanthus.
- To Mr. G. Prince, Oxford, for Roses.

*Award of Merit.*

To *Cyclamen persicum* 'Giant Shell Pink' (votes 10 for, 2 against), from Messrs. Sutton, Reading. A large-flowered, pale-pink variety of excellent form.

To *Lachenalia* 'New Whitewell Hybrids' (votes unanimous), from Messrs. Barr, Taplow. This fine strain was raised by Rev. J. Jacob, and the flowers exhibited on this occasion were grown by Mr. W. Mauger, of Guernsey. All the flowers are large and vary in colour from deep gold to lemon-yellow. Some are tinged with reddish-orange, others are edged with brownish-crimson, while some are spotted with green.

**Other Exhibits.**

- Messrs. H. Chapman, Rye: *Freesia* 'Jollity.'
- Mr. E. J. Henderson, Englefield Green: *Hippeastrums*.
- Mr. W. E. Hewitt, Henley-on-Thames: *Carnation* 'Baroness de Brien.''
- Misses Hopkins, Shepperton: *Primroses*.
- Rev. J. Jacob, Whitewell: *Freesia* 'Butterfly' and *Lachenalia* 'Pegu.'
- Mr. B. Pinney, Durweston: *Violets*.
- Messrs. Reamsbottom, West Drayton: *Anemones*.

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*Section B.*

Mr. W. J. BEAN, V.M.H., in the Chair, and fourteen other members present.

**Awards Recommended:—**

*Silver-gilt Banksian Medal.*

- To Messrs. Cutbush, Barnet, for rock garden and shrubs.
- To Messrs. Tucker, Oxford, for alpine.
- To Messrs. Wallace, Tunbridge Wells, for shrubs.

*Silver Banksian Medal.*

- To Messrs. Cuthbert, Southgate, for Azaleas.
- To Messrs. Carter Page, London, for shrubs and alpine.
- To Messrs. Prichard, Christchurch, for alpine.
- To Mr. G. Reuthe, Keston, for shrubs and alpine.
- To Messrs. Russell, Richmond, for forced shrubs.

*Bronze Banksian Medal.*

- To Messrs. Baker, Codsall, for shrubs and alpine.
- To Messrs. Barr, Taplow, for alpine.
- To Messrs. Cheal, Crawley, for alpine.
- To Messrs. Gill, Falmouth, for *Rhododendrons*.
- To Messrs. Waterer, Sons & Crisp, Twyford, for shrubs.
- To Mr. F. G. Wood, Ashted, for shrubs and alpine.

*Award of Merit.*

To *Crocus* 'Blue Butterfly' (votes unanimous), from H. McD. Edelsten, Esq., Lindfield. This charming variety originated as a chance seedling presumed to be a cross between *Crocus aeneus* and *C. biflorus*. Its short flowers are violet-blue on the outside of the segments, but paler inside, and the stigmata are bright orange-red.

To *Kitchingia uniflora* (votes 12 for), from the Cambridge Botanic Garden. This is a very pretty and uncommon prostrate greenhouse plant from Madagascar. It grows about 4 inches high and has thick, fleshy leaves almost round in shape, and having reddish margins. The comparatively large, pale silvery-pink, tubular flowers, borne on very slender stems, have the corolla narrowed at the base and at the mouth.

To *Plectranthus chivadzulensis* (votes 8 for, 1 against), from Sir John F. Ramsden, Bt., Gerrard's Cross. A very graceful greenhouse plant belonging to



the Labiatae. It was raised from seed brought home by the exhibitor in 1922 from Kenya Colony. It grows about 3 feet high and has slender branches bearing loose panicles of long-lipped, bright blue flowers, which are very attractive. The Nettle-like leaves are sharply toothed.

To Rhododendron 'Almondtime' (votes 11 for), from Col. Stevenson R. Clarke, C.B., Cuckfield. This variety is the result of a cross between *R. sutchuenense* and *R. 'Cornubia'*. It bears good trusses of wide-open flowers of a bright cerise-pink colour with a few dark crimson dots on the upper segments.

#### Other Exhibits.

Mr. Klinkert, Richmond : clipped Box trees.  
 Lord Lambourne, Romford : Azalea 'Albert-Elizabeth.'  
 Mrs. Lloyd Edwards, Trevor : hybrid Saxifrage.  
 Messrs. Maxwell & Beale, Broadstone : alpinas.  
 Messrs. Skelton & Kirby, Pirbright : shrubs and alpinas.

### FLORAL COMMITTEE, MARCH 10, 1925.

#### Section A.

Mr. H. B. MAY, V.M.H., in the Chair, and seventeen other members present.

#### Awards Recommended :—

##### Gold Medal.

To Messrs. Carter, Raynes Park, for Hyacinths.  
 To Mr. J. W. Forsyth, Totteridge, for Cyclamen.

##### Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.  
 To Mr. G. H. Dalrymple, Bartley, for Freesia 'Wistaria.'  
 To Mr. E. J. Hicks, Hurst, for Roses.  
 To Messrs. S. Low, Enfield, for Carnations and other greenhouse plants.  
 To Messrs. Lowe & Shawyer, Uxbridge, for Iris 'Wedgwood.'  
 To Messrs. Russell, Richmond, for forced shrubs.

##### Bronze Banksian Medal.

To Misses Allen Brown, Henfield, for Violets.  
 To Mr. C. Engelmann, Saffron Walden, for Carnations.  
 To Misses Hopkins, Shepperton, for Primroses.  
 To Mr. G. A. Miller, Wisbech, for Polyanthus.  
 To Mr. G. Prince, Oxford, for Roses.

##### First-class Certificate.

To Freesia 'Wistaria' (votes unanimous), from Mr. G. H. Dalrymple, Bartley. A large lavender-mauve variety with a white throat and a pleasing scent. It received an Award of Merit on March 14, 1922.

#### Other Exhibits.

B. H. Buxton, Esq., Byfleet : genetics of coloured Primroses.  
 Lord Lambourne, Romford : Azalea 'Albert-Elizabeth.'  
 Mr. B. Pinney, Durweston : Violets.  
 Messrs. Reamsbottom, West Drayton : Anemones.

#### Section B.

Mr. C. T. MUSGRAVE in the Chair, and eighteen other members present.

#### Awards Recommended :—

##### Silver-gilt Banksian Medal.

To Mr. G. Reuthe, Keston, for shrubs and alpinas.

*Silver Banksian Medal.*

- To Messrs. Cutbush, Barnet, for shrubs and rock garden.
- To Messrs. Gill, Falmouth, for Rhododendrons.
- To Messrs. Carter Page, London, for shrubs and alpinas.
- To Messrs. Prichard, Christchurch, for alpinas.
- To Messrs. Tucker, Oxford, for alpinas.
- To Messrs. Waterer, Sons & Crisp, Twyford, for shrubs and alpinas.

*Bronze Banksian Medal.*

- To Messrs. Barr, Taplow, for shrubs and alpinas.
- To Mr. H. Hemsley, Crawley, for shrubs.
- To Messrs. Skelton & Kirby, Pirbright, for shrubs and alpinas.
- To Mr. F. G. Wood, Ashted, for shrubs and alpinas.

*Award of Merit.*

To Rhododendron 'Leonardslee Gem of the Woods' (votes 8 for, 2 against), from Lady Loder, Horsham. This beautiful variety was raised at Leonardslee in 1912 as the result of a cross between *R. virgatum* and a *R. ciliatum* hybrid. Its medium-sized, broadly campanulate flowers are pure white and borne in twos and threes. The lanceolate leaves are deep green above and paler beneath, while the upper surface is hairy like the margins.

To *Salix gracilistyla* (votes 14 for), from Hon. Vicary Gibbs (gr. Mr. E. Beckett), Elstree. A low-spreading Willow from Japan and Manchuria. The catkins are produced on the naked shoots in March and April and are silvery-grey suffused with red. The leaves which follow are characterized by their many veins.

*Cultural Commendation.*

- To the Cambridge Botanic Garden for *Columnnea Banksii*.

**Other Exhibits.**

- Messrs. Baker, Codsall : shrubs and alpinas.
- C. Ingram, Esq., Benenden : *Prunus subhirtella albo-rubescens*, *P. Conradinae flore pleno*.
- Mr. Klinkert, Richmond : clipped Box trees.
- Mr. M. Nicholls, Kemsing : *Iris* × *Edlmannii* (*I. alata* × *I. palestina*).
- J. B. Stevenson, Esq., Ascot : *Rhododendron* sp. Kingdon Ward 3952.
- W. Van de Weyer, Esq., Dorchester : *Craterostigma plantagineum*, passed to Scientific Committee with a recommendation for a Botanical Certificate.
- Messrs. R. Veitch, Exeter : *Acacia* 'Exeter Hybrid.'

FLORAL COMMITTEE, MARCH 24, 1925.

*Section A.*

Mr. H. B. MAY, V.M.H., in the Chair, and fifteen other members present.

**Awards Recommended :—**

*Silver-gilt Banksian Medal.*

- To Messrs. Allwood, Haywards Heath, for Carnations.

*Silver Banksian Medal.*

- To Mr. C. Engelmann, Saffron Walden, for Carnations.
- To Mr. E. J. Hicks, Hurst, for Roses.
- To Messrs. S. Low, Enfield, for Carnations and other greenhouse plants.

*Bronze Banksian Medal.*

- To Messrs. Blackmore & Langdon, Bath, for Polyanthus.
- To Mr. G. A. Miller, Wisbech, for Polyanthus.
- To Mr. A. Pratt, Brighton, for Polyanthus.
- To Messrs. Sutton, Reading, for Cinerarias.

*Award of Merit.*

To *Primula* 'Bunt' (votes unanimous), from Messrs. Baker, Codsall. This is a really good violet-blue Primrose with a very small pale-yellow eye. It was raised by the exhibitors in 1922 as the result of a cross between 'Wanda' and 'Wilson's Blue.' It is very free flowering and retains its colour well.

**Other Exhibits.**

Misses Hopkins, Shepperton : Primroses.  
 Mr. B. Pinney, Durweston : Violets.  
 Mr. G. Prince, Oxford : Roses.  
 Messrs. Reamsbottom, West Drayton : Anemones.

*Section B.*

Mr. C. T. MUSGRAVE in the Chair, and eighteen other members present.

**Awards Recommended :—***Silver-gilt Banksian Medal and Letter of Appreciation.*

To M. Fenwick, Esq., Stow-on-the-Wold, for alpinism in pans.

*Silver-gilt Banksian Medal.*

To Messrs. Russell, Richmond, for forced shrubs.

*Silver Banksian Medal.*

To Messrs. Cutbush, Barnet, for shrubs and alpinism.  
 To Messrs. Cuthbert, Southgate, for Azaleas and other shrubs.  
 To Messrs. C. Elliott, Stevenage, for alpinism.  
 To Messrs. Gill, Falmouth, for Rhododendrons.  
 To Messrs. Carter Page, London, for shrubs and alpinism.  
 To Messrs. Prichard, Christchurch, for alpinism.  
 To Mr. G. Reuthe, Keston, for shrubs and alpinism.  
 To Messrs. Rogers, Southampton, for shrubs and alpinism.  
 To Messrs. Tucker, Oxford, for alpinism.  
 To Messrs. Waterer, Sons & Crisp, Twyford, for shrubs and alpinism.

*Bronze Banksian Medal.*

To Messrs. Baker, Codsall, for alpinism and shrubs.  
 To Messrs. Skelton & Kirby, Pirbright, for alpinism.  
 To Mr. G. G. Whitelegg, Chislehurst, for shrubs and alpinism.  
 To Mr. F. G. Wood, Ashted, for shrubs and alpinism.

*Award of Merit.*

To Rhododendron 'Bernard Gill' (votes 15 for), from Messrs. Gill, Falmouth. This variety bears compact trusses of soft rose-red flowers with crimped margins. There are a few dots of slightly deeper colour on the upper segments of the flowers.

To Rhododendron 'Fireball' (votes 12 for), from Messrs. Gill, Falmouth. This variety is the result of a cross between *R. barbatum* and *R. 'Ascot Brilliant'*. Its rich carmine-scarlet campanulate flowers are of medium size and are borne in compact trusses.

**Other Exhibits.**

Lady Aberconway and Hon. H. D. McLaren, Bodnant : *Rhododendron spectabile*.

Mr. Klinkert, Richmond : clipped Box trees.

Sir William Lawrence, Bt., Burford : *Brunfelsia calycina macrantha*, *Dieles iridioides Macowanii*, *Hymenoporum flavum*, *Passerina filiformis*.

Messrs. Maxwell & Beale, Broadstone : alpinism.

H. Armytage Moore, Esq., Saintfield : *Pieris japonica* F. 8945.

L. de Rothschild, Esq., Exbury : *Rhododendron scabrifolium* F. 15103.

Mr. A. Sheppard, Birmingham : alpinism.

J. B. Stevenson, Esq., Ascot : *Rhododendron pubescens*.

FLORAL COMMITTEE, APRIL 7, 1925.

*Section A.*

Mr. H. B. MAY, V.M.H., in the Chair, and eleven other members present.

**Awards Recommended :—**

*Silver-gilt Banksian Medal.*

To Mr. G. H. Dalrymple, Bartley, for Freesias.

*Silver Banksian Medal.*

To Messrs. Allen, Norwich, for Roses.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. B. Cant, Colchester, for Roses.

To Messrs. Cutbush, Barnet, for Roses.

To Mr. E. J. Hicks, Hurst, for Roses.

To Mr. C. Engelmann, Saffron Walden, for Carnations.

To Messrs. S. Low, Enfield, for Carnations and other greenhouse plants.

To Mr. G. A. Miller, Wisbech, for Polyanthus.

To Napsbury Mental Hospital, St. Albans, for Primulas.

To Messrs. Sutton, Reading, for Cinerarias.

*Award of Merit.*

To Carnation 'Shot Silk' (votes unanimous), from Messrs. Allwood, Haywards Heath. A perpetual-flowering variety of good form raised by the exhibitors. It is of an uncommon shade of chestnut flaked with red.

To Primula 'Barbara Barker' (votes 6 for, 1 against), from Messrs. C. Elliott, Stevenage. This beautiful Primula is the result of a cross between *P. marginata* 'Linda Pope' and *P. 'Zulieka Dobson.'* It has large lilac flowers, the eyes of which are white and the calyces mealy.

To *Primula malacoides* 'Golden Eye' (votes unanimous), from Messrs. Carter, Raynes Park. A very free flowering dwarf and compact variety of this popular greenhouse Primula. The flowers are white with a golden eye.

**Other Exhibits.**

Mrs. Barnard, Towcester : Polyanthus.

Messrs. John & A. H. Crook, Beaconsfield : Polyanthus.

Misses Hopkins, Shepperton : Spring flowers.

Mr. B. Pinney, Durweston : Violets.

Messrs. Reamsbottom, West Drayton : Anemones.

R. Chetwynd Stapylton, Esq., Great Berkhamsted : Carnation 'Headlands Beauty.'

*Section B.*

Mr. C. T. MUSGRAVE in the Chair, and eleven other members present.

**Awards Recommended :—**

*Silver-gilt Banksian Medal.*

To Messrs. C. Elliott, Stevenage, for alpinines.

To Messrs. Carter Page, London, for shrubs and alpinines.

To Mr. G. Reuthe, Keston, for shrubs and alpinines.

To Messrs. Rogers, Southampton, for shrubs and alpinines.

To Messrs. Russell, Richmond, for forced shrubs.

To Messrs. Waterer, Sons & Crisp, Twyford, for shrubs and alpinines.

*Bronze Banksian Medal.*

To Messrs. Baker, Codsall, for shrubs and alpinines.

To Messrs. Cheal, Crawley, for shrubs and alpinines.

To Messrs. Maxwell & Beale, Broadstone, for alpinines.

To Messrs. Prichard, Christchurch, for alpinines.

To Mr. F. G. Wood, Ashted, for shrubs and alpinines.

*Award of Merit.*

To *Lachenalia glaucina* (votes 6 for), from Rev. J. Jacob, Whitchurch. An interesting species from South Africa useful for cultivation in the alpine house and conservatory. It is very sweetly scented and a good doer, seeding freely when fertilized. Its strap-shaped leaves and the flower stems are spotted with brown. The colour of the flowers is pale green, while the outer segments are tipped with a deeper shade of the same colour.

To *Rhodothamnus Chamaecistus* (votes 8 for), from Messrs. C. Elliott, Stevenage. A charming dwarf alpine shrub belonging to the Ericaceae. It has rosettes of small ovate ciliate leaves about  $\frac{1}{2}$  inch long. The flower, which measures from  $\frac{1}{2}$  inch to  $\frac{3}{4}$  inch wide, has a corolla consisting of five broadly ovate overlapping segments, which are pink tipped with white. The dark stamens are borne on long filaments which overreach the corolla.

**Other Exhibits.**

Marquis of Headfort, Kells: Rhododendrons from Mr. Kingdon Ward's expedition, *R. mollicomum*, *R. mullense*, *R. talmateium*.

Mr. Klinkert, Richmond: clipped Box trees.

Messrs. Skelton & Kirby, Pirbright: shrubs and alpine.

## FLORAL COMMITTEE, APRIL 21, 1925.

*Section A.*

Mr. H. B. MAY, V.M.H., in the Chair, and thirteen other members present.

**Awards Recommended :—***Silver Banksian Medal.*

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. Blackmore & Langdon, Bath, for Polyanthus.

To Messrs. B. R. Cant, Colchester, for Roses.

To Messrs. S. Low, Enfield, for greenhouse plants.

*Bronze Banksian Medal.*

To Messrs. Cutbush, Barnet, for Roses.

To Mr. J. Douglas, Great Bookham, for Auriculas.

To Mr. C. Engelmann, Saffron Walden, for Carnations.

To Messrs. Ladhams, Southampton, for hardy plants.

To Messrs. S. Low, Enfield, for Roses and Carnations.

To Mr. G. A. Miller, Wisbech, for Polyanthus.

To Mr. J. H. Pemberton, Havering-atte-Bower, for Roses.

*Award of Merit.*

To Hippeastrum 'Black Beauty' (votes unanimous), from Lt.-Col. Sir George Holford, K.C.V.O., Tetbury. A very deep crimson variety of beautiful form.

To Hippeastrum 'Iceberg' (votes unanimous), from Lt.-Col. Sir George Holford, K.C.V.O., Tetbury. An excellent white variety with slight green markings at the base of the segments.

To Hippeastrum 'Pink Blossom' (votes unanimous), from Lt.-Col. Sir George Holford, K.C.V.O., Tetbury. This magnificent variety is of a deep rose-pink colour with small white markings at the middle of the segments. This is probably the finest variety of its colour yet raised.

To Rose 'Roselandia' (votes unanimous), from Mr. W. Stevens, Hoddesdon. A very pleasing golden-apricot coloured H.T. rose of excellent form. It produces its flowers on good strong stems and is an excellent variety for forcing, so that it should become a favourite for market work. It is a sport from 'Golden Ophelia.'

**Other Exhibits.**

Mrs. Barnard, Towcester: *Anemone coronaria* 'Duncote Strain.'

Messrs. Barr, Taplow: Irises.

Miss C. Christy, Chelmsford: Polyanthus 'Greenway Glory.'

Messrs. John & A. H. Crook, Beaconsfield: Polyanthus.

Mr. C. Gray, Cobham: seedling Carnations.

Mrs. Milner, Sheffield: Polyanthus 'Totley Strain.'

Mr. B. Pinney, Durweston: Violets.

Messrs. Reamsbottom, West Drayton: Anemones.

Messrs. Sutton, Reading: Echiums.

# 1 PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

## Section B.

Mr. C. T. MUSGRAVE in the Chair, and fifteen other members present.

### Awards Recommended :—

#### *Silver-gilt Banksian Medal.*

- To Messrs. Cheal, Crawley, for shrubs.
- To Messrs. C. Elliott, Stevenage, for alpiners.
- To Hon. Vicary Gibbs (gr. Mr. E. Beckett), Elstree, for alpiners in pans.
- To Messrs. Prichard, Christchurch, for alpiners.

#### *Silver Banksian Medal.*

- To Messrs. Cuthbert, Southgate, for forced shrubs.
- To Messrs. Gill, Falmouth, for Rhododendrons and Anemones.
- To Messrs. Hillier, Winchester, for shrubs.
- To Messrs. Carter Page, London, for shrubs and alpiners.
- To Mr. G. Reuthe, Keston, for shrubs and alpiners.
- To Messrs. Rogers, Southampton, for shrubs and alpiners.
- To Messrs. Russell, Richmond, for shrubs.
- To Messrs. Tucker, Oxford, for shrubs and alpiners.
- To Mr. W. H. Walters, Cheltenham, for miscellaneous rare plants.
- To Messrs. Waterer, Sons & Crisp, Twyford, for shrubs and alpiners.
- To Mr. F. G. Wood, Ashted, for shrubs and alpiners.

#### *Bronze Banksian Medal.*

- To Messrs. Cutbush, Barnet, for rock garden and shrubs.
- To Messrs. Maxwell & Beale, Broadstone, for alpiners.

#### *First-class Certificate.*

To *Prunus Sargentii* (votes unanimous), from Hon. Vicary Gibbs (gr. Mr. E. Beckett), Elstree. This beautiful deciduous, early-flowering tree was introduced from Japan in 1893 by Professor C. S. Sargent. The flowers, which measure from 1½ inch to 1¾ inch across, are pale pink in colour and are borne in bunches of from two to six. The petals are obovate and notched at the top. The leaves are rather variable in shape, but are sharply toothed and drawn out to a slender point. They are of a reddish tint when young.

#### *Award of Merit.*

To *Berberis stenophylla coccinea* (votes unanimous), from Hon. Vicary Gibbs, Elstree. A compact-growing shrub bearing tightly packed racemes of reddish-orange semi-double flowers.

To *Gladious Mackinderi* (votes 8 for), from Sir John F. Ramsden, Bt., Gerrard's Cross. The corms of this interesting species were brought home by the exhibitor from Kenya Colony. The flowers, borne on a tall, slender stem, are bright orange-salmon in colour.

To *Iris Wattii* (votes 9 for), from Mr. W. H. Walters, Cheltenham. A beautiful tender white-flowered species having waved edges to the segments and a small orange crest in the middle of a blotch of the same colour on the falls. It is a very rapid and strong grower and has very long broad leaves. The flowers are borne upon a growth which is produced during the previous season.

To Rhododendron 'Elsae' (votes unanimous), from Mr. G. Reuthe, Keston. This fine hybrid was raised by the exhibitor as the result of a cross between *R. grande* and *R. Falconeri*. The large ivory-white campanulate flowers, with a crimson blotch at one side of the base, are borne in fine trusses of twenty or more. The anthers are dark brown. The long, shiny, dark green obovate leaves are covered with brown tomentum on the under side.

To Rhododendron 'Garnet' (votes unanimous), from Sir George Holford, K.C.V.O. (gr. Mr. F. J. Clark), Tetbury. This very free flowering, handsome greenhouse Rhododendron belongs to the *R. javanicum* × *R. jasmminiflorum* section to which Messrs. J. Veitch, of Chelsea, added so many fine varieties. It is the result of a cross between the varieties 'Ne Plus Ultra' and 'Ruby.' The wide-mouthed trumpet-shaped flowers are blood-red in colour.

To Rhododendron 'Muriel' (votes 10 for, 3 against), from Lady Loder, Horsham. A *R. Falconeri* hybrid with trusses of from twelve to fourteen very large creamy-white campanulate flowers, with a dark crimson blotch at the base. Each bloom is borne on a stout pinkish pedicel about 2 inches long. The anthers are

chocolate coloured. The dark green leaves measure about 9 inches long, and are covered with brown tomentum beneath.

To *Rhododendron sphaeranthum* (votes 8 for, 2 against), from the Marquis of Headfort (gr. Mr. W. E. Trevithick), Kells. One of Mr. Kingdon Ward's introductions, numbered 3998. The narrow lanceolate leaves are about 1 inch long and slightly tomentose on the under sides. The pale pink Daphne-like flowers are borne in dense terminal heads.

To *Stachyurus chinensis* (votes 9 for), from Hon. Vicary Gibbs (gr. Mr. E. Beckett), Elstree. The Chinese representative of this genus introduced by Mr. E. H. Wilson in 1900 and 1907 from Kiagsi and Western Hupeh. Its racemes of greenish flowers measure from 3 to 4 inches long, and as exhibited on this occasion it appeared to be more elegant and more decorative than *S. praecox*.

To *Stachyurus praecox* (votes 10 for), from Hon. Vicary Gibbs, Elstree. A hardy deciduous early-flowering shrub from Japan. Its cream-coloured rounded flowers are borne in stiff short drooping racemes.

#### Cultural Commendation.

To Mr. G. Reuthe, Keston, for *Saxifraga Stuartii*.

To the Duchess of Wellington, Basingstoke, for *Ismene calathina*.

#### Other Exhibits.

Messrs. Baker, Codsall: shrubs and alpinas.

Cambridge Botanic Garden: *Prunus pendula*.

Mr. Klunkert, Richmond: clipped Box trees.

Miss J. Leighton, Chelsfield: *Paeonia corsica*.

Messrs. Smith, Guernsey: *Rhododendron* 'Charles Smith.'

E. Horace Walpole, Esq., Rathnew; seedling *Rhododendron*.

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### FLORAL COMMITTEE, MAY 5, 1925.

#### Section A.

Mr. H. B. MAY, V.M.H., in the Chair, and eighteen other members present.

#### Awards Recommended:—

##### Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. Cuthbert, Southgate, for Hydrangeas.

To Mr. G. H. Dalrymple, Bartley, for Primulas.

To Mr. J. Douglas, Great Bookham, for Auriculas.

To Mr. C. Engelmann, Saffron Walden, for Carnations.

To Mr. E. J. Hicks, Twyford, for Roses.

To Messrs. S. Low, Enfield, for Roses, Carnations and other greenhouse plants.

##### Bronze Banksian Medal.

To Messrs. B. Cant, Colchester, for Roses.

To Maytham Gardens, Rolvenden, for Irises, etc.

To Mr. G. A. Miller, Wisbech, for Polyanthus.

To Mr. J. H. Pemberton, Havering-atte-Bower, for Roses.

To Messrs. Reamsbottom, West Drayton, for Anemones.

##### Award of Merit.

To *Anemone hortensis* 'Blue Gown' (votes unanimous), from Messrs. Carter Page, London. The flowers of this variety are large and of a deep violet-blue colour. The centres are very double.

To Rose 'Sylvia' (votes unanimous), from Mr. W. Stevens, Hoddesdon. An excellent H.T. Rose of nice shape. The colour is coral-pink, shading to salmon-buff at the tips of the petals.

#### Other Exhibits.

W. B. Cranfield, Esq., Enfield Chase: *Primula* 'Commodore.'

Messrs. John & A. H. Crook, Beaconsfield: *Polyanthus*.

Messrs. Jarman, Chard: *Pelargoniums* and *Violets*.

Lady Mond, Romsey: *Carnation* 'Derek.'

## lii PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

### Section B.

Mr. C. T. MUSGRAVE in the Chair, and eighteen other members present.

#### Awards Recommended :—

##### *Silver-gilt Banksian Medal.*

To Lady Aberconway and Hon. H. D. McLaren, Bodnant, for Rhododendrons.  
To T. H. Lowinsky, Esq., Sunninghill, for Rhododendrons.  
To E. J. P. Magor, Esq., St. Tudy, for Rhododendrons.  
To Lionel de Rothschild, Esq., Exbury, for Rhododendrons.

##### *Silver Banksian Medal.*

To Col. Stephenson Clarke, C.B., Cuckfield, for Rhododendrons.  
To Messrs. Cheal, Crawley, for shrubs and Dahlias.  
To Messrs. Gill, Falmouth, for Rhododendrons.  
To Messrs. Prichard, Christchurch, for alpinas.  
To Sir John Ramsden, Bt., Gerrard's Cross, for Rhododendrons.  
To Mr. G. Reuthe, Keston, for alpinas and Rhododendrons.  
To Messrs. Rogers, Southampton, for alpinas.  
To Messrs. Russell, Richmond, for Clematis and other shrubs.  
To Mr. F. G. Wood, Ashtead, for shrubs and alpinas.

##### *Bronze Banksian Medal.*

To Messrs. C. Elliott, Stevenage, for alpinas.  
To Messrs. Ladhams, Southampton, for shrubs and alpinas.  
To Messrs. Maxwell & Beale, Broadstone, for alpinas.  
To Lt.-Col. Messel, Handcross, for Rhododendrons.  
To Mr. R. C. Notcutt, Woodbridge, for shrubs.  
To Messrs. Carter Page, London, for shrubs and alpinas.  
To Messrs. Tucker, Oxford, for alpinas.  
To Messrs. R. Veitch, Exeter, for Rhododendrons.  
To Messrs. Waterer, Sons & Crisp, Twyford, for shrubs and alpinas.  
To Mr. W. Wells, jun., Merstham, for alpinas.

##### *First-class Certificate.*

To *Rhododendron Tyermannii* (votes unanimous), from Messrs. Gill, Falmouth. This magnificent species has very large, wide-open, white flowers with creamy markings at the base. The flowers are borne in threes, and the leaves are dark green and rather thin.

##### *Award of Merit.*

To *Acer Pseudoplatanus brilliantissimum* (votes unanimous), from Hon. Vicary Gibbs, Elstree. A very handsome variety of the Sycamore with its young leaves of a beautiful pinkish colour.

To *Retinispora plumosa nana compressa* (votes unanimous), from Messrs. van Nes, Boskoop, Holland. A very compact growing sport from *R. plumosa*. The young pale green growths are very attractive.

To *Rhododendron campanulatum* 'Knap Hill' variety (votes 13 for, 1 against), from Lionel de Rothschild, Esq., Exbury. The flowers of this variety are of medium size, wide open, and of a deep lilac colour. The trusses are compact and consist of ten to twelve blooms.

To *Rhododendron* 'Dorothea' (votes unanimous), from T. H. Lowinsky, Esq., Sunninghill. This beautiful variety resulted from a cross made by the exhibitor between *R. Auchlandii rosea superba* and *R. decorum*. The very wide open flowers are of a blush-pink colour and are borne in good trusses of about fifteen blooms. There are a few light dots on the upper segments of the flowers.

To *Rhododendron* 'Hollandia' (votes unanimous), from Messrs. van Nes, Boskoop, Holland. This plant was exhibited as a Japanese Azalea. It is the result of a cross between *A. Hinodegiri* and *A. Kaempferi*. The small rich scarlet flowers are borne with very great freedom.

To *Rhododendron sperabile* (votes unanimous), from Lionel de Rothschild, Esq., Exbury. This is one of the late Mr. R. Farrer's introductions under the number 888. The plant exhibited bore seven medium-sized, wide-open, scarlet, campanulate flowers. The lanceolate leaves measure about four inches long and are covered on the under side with thick light brown tomentum.



To *Rhododendron* 'William Watson' (votes 12 for, 2 against), from Messrs. Gill, Falmouth. This hardy *Rhododendron* was raised by the exhibitors. Its wide-open flowers are of a reddish shade on the outside, while the inside is pink.

To *Senecio* 'Beauty of Cambridge' (votes unanimous), from Cambridge Botanic Garden. This very useful free-flowering greenhouse plant was raised by the late Mr. Irwin Lynch as the result of a cross between *S. Heritieri* and *S. cruentus albus*. Its flowers are white tipped with pale violet and often measure 2 inches across. The centre is of a bluish colour. The chief value of this plant lies in its very long period of flowering, which lasts from six to seven months.

*Cultural Commendation.*

To Dr. N. W. Jenkin, Hindhead, for *Androsace argentea* and *Thlaspi rotundifolium*.

**Other Exhibits :—**

Messrs. Baker, Codsall : shrubs and alpine.

Capt. Collingwood Ingram, Benenden : *Prunus serrulata* 'Gioiko.'

Mr. R. C. Notcutt, Woodbridge : *Cytisus Beanii*.

Mr. F. Roberts, Leigh-on-Sea : *Pyrus Malus Robertsii* and *Pyrus Niedzwetzkyana* 'Francis Roberts.'

Messrs. Skelton & Kirby, Pirbright : shrubs.

FLORAL COMMITTEE, MAY 19, 1925.

AT CHELSEA.

*Section A.*

Mr. H. B. MAY, V.M.H., in the Chair, and twelve other members present.

**Awards Recommended :—**

To Carnation 'Red Laddie' (votes unanimous), from Mr. C. Engelmann, Saffron Walden. A very fine light red sport from the well-known variety 'Laddie.' The flowers are large and the petals broad.

To Rose 'Superba' (votes unanimous), from Messrs. Cutbush, Barnet. This is a dwarf perpetual polyantha variety especially suitable for bedding purposes. The flowers are double and of a very striking deep crimson-scarlet colour.

**Other Exhibits.**

Messrs. Artindale, Sheffield : Calendula 'Ball's variety.'

Commendatore Cecil Hanbury, M.P., La Mortola, Italy : *Gerbera hybrida* 'La Mortola strain.'

Messrs. S. Low, Enfield : Perpetual Malmaison Carnation 'Saturn'

Dr. McWatt, Duns : Blue Border Auriculas.

G. E. A. Richards, Esq., Bristol : *Gladolus nanus* 'Nymph.'

A. Timmers, Esq., Reading : *Viola gracilis* 'H. Copyn.'

Messrs. Waterer, Sons & Crisp, Twyford : Lupines

*Section B.*

Mr. W. J. BEAN, V.M.H., in the Chair, and fifteen other members present.

**Awards Recommended :—**

*First-class Certificate.*

To *Paeonia obovata alba* (votes unanimous), from Mr. J. C. Allgrove, Slough. This is one of Mr. E. H. Wilson's beautiful introductions from Hupeh, China. The large single flowers each have six or seven white obovate petals with a mass of golden stamens through which protrude the red stigmas. The stems and the handsome leaves are red tinted.

*Award of Merit.*

To *Anemone sylvestris* 'Spring Beauty' (votes 12 for), from Messrs. Jones & Ingwersen, Letchworth. This useful little plant for the rock or wild garden grows from twelve to eighteen inches high and bears white flowers with pale yellow stamens.

To *Diosma uniflora* (votes unanimous), from Rev. A. T. Boscawen, Ludgvan. A small shrubby plant of bushy habit from the Cape. The flowers are about one inch wide and consist of five ovate white petals with a crimson streak down the middle of each. The calyx is red inside and its segments are visible between the petals. The leaves are small, dark green, narrow and serrated.

To *Primula nivalis* (Ward) (votes 7 for), from Mr. A. K. Bulley, Neston. This form of *P. nivalis* has long narrow serrated leaves slightly mealy on the under side. The flowers are violet with a white eye. The calyces are deep purple outside and covered with yellow farina inside. The inflorescence is supported on a very stout stem.

To *Rhododendron* 'A. Gilbert' (votes 7 for), from T. H. Lowinsky, Esq., Sunninghill. A seedling raised by the exhibitor as the result of a cross between *R. campylocarpum* and *R. discolor*. The flowers are borne in trusses of about ten. Their colour is pale creamy-buff suffused with rose-pink particularly towards the margins. The leaves are broad and dark green.

To *Rhododendron* 'Coquette' (votes unanimous), from the executors of the late Anthony Waterer, Woking. A free-flowering Azalea with very charming bright pink flowers having the upper segments almost entirely golden yellow.

To *Rhododendron* 'Gill's Gloriosa' (votes 11 for, 1 against), from Messrs. Gill, Falmouth. This *Rhododendron* resulted from a cross made by the exhibitors between *R.* 'White Pearl' and *R. Luscombei superba*. It has very large elongated trusses of about fifteen blooms. The colour of the flowers is bright cerise outside and a paler shade of the same colour inside.

To *Rhododendron* 'Goldsworth Yellow' (votes 9 for), from Mr. W. C. Slocock, Woking. It is suggested that the probable parentage of this free-flowering variety is *R. caucasicum*  $\times$  *R. campylocarpum*. The flowers are of medium size, wide open, pale yellow in colour with greenish dots on the upper segments. They are borne in compact trusses.

To *Rhododendron ledoides* (votes 9 for), from Mr. A. K. Bulley, Neston. This delightful little dwarf species was introduced by Mr. G. Forrest, who found it growing on the mountains of the Tibeto-Yunnan frontier at an elevation of 13,000 feet above sea-level. It grows from 2 to 2½ feet high, and has roundish heads of small white flowers sometimes tinged with pink. The small linear-lanceolate leaves are dark green above and covered with small brownish scales underneath.

To *Rhododendron* 'Marion Merriman' (votes 4 for), from the executors of the late Anthony Waterer, Knap Hill, Woking. A medium-sized, bright yellow Azalea with a big golden blotch on the upper segments of the flowers.

To *Rhododendron* 'Mary' (votes 6 for, 2 against), from Messrs. van Nes, Boskoop, Holland. A Japanese Azalea resulting from a cross between *R. malvatica* and *R. Kaempferi*. It is very free flowering and has large bright carmine flowers with pale brown dots on the upper segments.

To *Rhododendron* 'Mary Waterer' (votes 10 for), from the executors of the late Anthony Waterer, Knap Hill, Woking. This handsome Azalea has large, almost flat, white flowers suffused with pale rose at the edges and having creamy markings on the upper segments.

To *Rhododendron* 'T. H. van Nes' (votes unanimous), from Messrs. van Nes, Boskoop, Holland. The large wide-open flowers of this variety are borne in compact trusses. The flowers are of a bright carmine-pink colour with a much paler centre.

To *Rhododendron* 'Tittenhurst Belle' (votes unanimous), from T. H. Lowinsky, Esq., Sunninghill. A seedling raised by the exhibitor as the result of a cross between *R.* 'Corona' and *R. Aucklandii*. The flowers are wide open and of a clear rose-pink colour, each individual standing well out from the elongated truss on a long reddish pedicel. The leaves are pale green and narrow.

To *Staphylea holocarpa* (votes 9 for, 1 against), from Lt.-Col. Sir George Holford, K.C.V.O., Tetbury. A very floriferous, handsome, deciduous shrub, introduced from Central China in 1908 by Mr. E. H. Wilson. It bears numerous panicles of white flowers with pinkish calyces and its narrow lanceolate leaves are minutely serrated.

To *Telopea oreades* (votes 6 for, 2 against), from Rev. A. T. Boscawen, Ludgvan. This beautiful tree, known as the 'Gippsland Waratah,' is a native of Victoria, Australia. It is a plant which can only be grown successfully in the open out of doors in England in the warmest and most sheltered spots. Its leaves are linear-oblong in shape gradually narrowing to the petiole. Their length is from 6 to 8 inches and their width from 1½ to 2 inches. They are dark green above and paler or somewhat glaucous beneath. The crimson flowers, which are tubular before opening, are borne in a capitulate raceme with a whorl of basal bracts.

*Botanical Certificate.*

To *Doryanthes Palmeri* (votes unanimous), from Commendatore Cecil Hanbury, M.P., La Mortola, Italy. A native of Queensland, with large broad-ribbed leaves 6 to 8 feet long. The flowering stem is from 8 to 10 feet high and the thyrsoid inflorescence is about 3 feet long and clothed with short lanceolate bracts. The individual flowers are scarlet outside and whitish within. At La Mortola this plant grows in the open without any protection and opens its flowers early in April.

**Other Exhibits.**

Messrs. Backhouse Nurseries, York : *Rosa Rouletti*.  
 Mrs. G. Blathwayt, West Porlock : *Aquilegia viridiflora*.  
 Messrs. Bowell & Skarratt, Cheltenham : *Viola pedata bicolor*.  
 Messrs. C. Elliott, Stevenage : *Androsace pulchella*.  
 Mr. L. Endtz, Boskoop : Rhododendrons.  
 Dame Alice Godman, Horsham : Rhododendron 'Peace.'  
 Mr. H. Hemsley, Crawley : *Anchusa italica* 'Hemsley's White.'  
 Messrs. Maxwell & Beale, Broadstone : *Gazania hybrida* 'Vanity.'  
 Capt. Pinwill, Trehane Probus : Berberis 'Capt. Pinwill.'  
 Messrs. Rogers, Cornwall : *Cordyline indivisa*, F.C.C. 1860.  
 Messrs. Watson, Killiney : Cytisus 'Dorothy Walpole.'

FLORAL COMMITTEE, JUNE 9, 1925.

*Section A.*

Mr. H. B. MAY, V.M.H., in the Chair, and sixteen other members present.

**Awards Recommended :—***Gold Medal.*

To Messrs. Bolton, Birdbrook, for Sweet Peas.  
 To Orpington Nurseries, Orpington, for Irises.

*Silver-gilt Banksian Medal.*

To Mr. J. C. Allgrove, Slough, for Eremurus and Anchusas.  
 To Messrs. Barr, Taplow, for Irises.  
 To Messrs. Bunyard, Maidstone, for Irises.  
 To Messrs. A. Dickson, Belfast, for Sweet Peas.  
 To Messrs. Dobbie, Edinburgh, for Aquilegias.  
 To Mr. H. J. Jones, Lewisham, for Hydrangeas.  
 To Mr. A. Perry, Enfield, for Irises.  
 To Baron Bruno Schröder, Englefield Green, for *Crassula coccinea minor*.  
 To Messrs. Wallace, Tunbridge Wells, for Irises.

*Silver Banksian Medal.*

To Messrs. Allwood, Haywards Heath, for Carnations.  
 To Messrs. Blackmore & Langdon, Bath, for Delphiniums.  
 To Mr. G. W. Downer, Chichester, for Lupines.  
 To Mr. F. Gifford, Hornchurch, for Pæonies.  
 To Messrs. Kelway, Langport, for Pæonies.  
 To Messrs. Ladhams, Southampton, for hardy plants.  
 To Messrs. S. Low, Enfield, for Carnations, Roses, etc.  
 To Mr. H. Marcham, Borough Green, for Lupines.  
 To Messrs. Prichard, Christchurch, for Lupines.  
 To Mr. G. Prince, Oxford, for Roses.  
 To Mr. C. Turner, Slough, for Roses.  
 To Messrs. Waterer, Sons & Crisp, Twyford, for Irises.  
 To Mr. G. G. Whitelegg, Chislehurst, for Irises.

*Bronze Banksian Medal.*

To Messrs. Baker, Codsall, for hardy plants.  
 To Mr. J. C. Beck, Henley, for Carnations.  
 To Mr. T. Carlile, Twyford, for Lupines.  
 To Mr. C. Engelmann, Saffron Walden, for Carnations.

To Messrs. Godfrey, Exmouth, for Poppies and Pelargoniums.  
 To Messrs. Harkness, Bedale, for Lupines and Poppies.  
 To Mr. C. H. Herbert, Birmingham, for Pinks.  
 To Messrs. Lowe & Gibson, Crawley Down, for Irises.  
 To Maytham Gardens, Rolvenden, for Lupines.  
 To Mr. G. A. Miller, Wisbech, for hardy plants.  
 To Mr. J. H. Pemberton, Havering-atte-Bower, for Roses.  
 To Messrs. Rich, Bath, for Lupines, Violas, etc.  
 To Messrs. Skelton & Kirby, Pirbright, for hardy plants.  
 To Mr. W. Wells, jun., Merstham, for hardy plants.

*Award of Merit.*

To *Ageratum* 'Little Blue Cloud' (votes unanimous), from Messrs. Dickson & Robinson, Manchester. A splendid compact dwarf bedding variety growing about 4 inches high. The flowers are deep lilac-mauve.

To Carnation 'Froyle Beauty' (votes unanimous), from Mrs. Summers, Alton. A good pale salmon-apricot seedling Border Carnation of good form.

To *Heuchera hybrida* 'Pink Delight' (votes 7 for), from Mr. G. A. Miller, Wisbech. A pale pink variety with exceptionally large bells. The colour deepens towards the edges of the flowers.

To *Hydrangea* 'Neige Orleanaise' (votes unanimous), from Mr. H. J. Jones, Lewisham. A very large creamy-white variety with serrated edges.

To *Hydrangea* 'Pasteur' (votes unanimous), from Mr. H. J. Jones, Lewisham. A very large light pink variety.

To *Pyrethrum* 'Avalanche' (votes 8 for), from Mr. H. Robinson, Hinckley. A good semi-double white seedling of large size raised by the exhibitor.

To *Salvia* 'Harbinger' (votes unanimous), from Messrs. Watkins & Simpson, London. An excellent bedding variety of very compact habit. The flowers are scarlet and borne in good spikes. The plants exhibited were raised from seed sown on February 11, 1925.

The following Irises were selected for trial at Wisley :—

From G. P. Baker, Esq., Bexley :

'Mesa,' 'Salawat,' 'Shalbruz.'

From the Orpington Nursery Co., Orpington :

'Flammenschwert,' 'Imperateur,' 'Mystic,' 'Princess Osra.'

**Other Exhibits.**

Chalk Hill Nurseries, Reading : hardy plants.

Messrs. Cheal, Crawley : *Lupinus* 'Orange Queen.'

F. H. Collis, Esq., Brentford : Pink 'Marcia Winefred.'

G. L. Currie, Esq., Farnborough : Geum 'Sheila' and Carnations.

Lord Hillingdon, Stony Stratford : Carnation 'Marygold.'

Misses Hopkins, Shepperton : hardy plants.

Sir W. Lawrence, Bt., Burford : *Hydrangea* 'Cunco.'

T. Startup, Esq., Ightham : *Pelargonium* 'Barbara.'

W. Staward, Esq., Melton Mowbray : Carnation 'Melton Beauty.'

Swanley Horticultural College, Swanley : *Clarkias*.

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*Section B.*

Mr. C. T. MUSGRAVE in the Chair, and fourteen other members present.

**Awards Recommended :—**

*Silver Banksian Medal.*

To Messrs. Waterer, Sons & Crisp, Twyford, for *Rhododendrons*.

To Mr. F. G. Wood, Ashted, for alpinines.

*Bronze Banksian Medal.*

To Messrs. Maxwell & Beale, Broadstone, for alpinines.

To Messrs. Rogers, Southampton, for alpinines.

To Messrs. Russell, Richmond, for *Clematis* and other shrubs.

To Messrs. Tucker, Oxford, for alpinines.

*Award of Merit.*

To *Cistus ladaniferus immaculatus* (votes unanimous), from Sir W. Lawrence, Bt., Burford. A beautiful unspotted form with creamy-white flowers measuring 4 inches across, and having central masses of golden stamens. The leaves are glutinous and linear-lanceolate in shape, dark green above and paler below.

To *Echium Wildpretii* (votes unanimous), from C. T. Musgrave, Esq., Godalming. A tall tender biennial from the Canary Islands. It bears a large dense thyrus of subsessile pale red flowers. The leaves are about 6 to 8 inches long, narrowly linear-lanceolate and softly hairy on both sides.

To Rhododendron 'Ida Waterer' (votes unanimous), from Messrs. Waterer, Sons & Crisp, Bagshot. A very late flowering variety bearing large trusses of smallish violet-tinted rose flowers having a few greenish dots and crinkled margins.

To Rhododendron 'Lady de Rothschild' (votes 8 for), from the Executors of the late Anthony Waterer, Knap Hill. This variety resulted from a cross between *R. Aucklandii* and *R. 'Sappho'*. Its wide-open flowers are white flushed with blush-pink and spotted with crimson on the upper segments. They are borne in good bold trusses.

To Rhododendron 'Monstrous' (votes unanimous), from Messrs. John Waterer, Sons & Crisp, Bagshot. This variety is the result of a cross between *R. 'Mrs. E. C. Stirling'* and a *R. Smirnowi* hybrid. It bears large trusses of wide-open flowers of a delightful rose-pink shade.

To Rhododendron 'Mrs. A. C. Kenrick' (votes 8 for), from the Executors of the late Anthony Waterer, Knap Hill. The parentage of this variety is unknown. It bears good compact trusses of deep rose-pink flowers, with some spots of a deeper shade on the upper segments.

To Rhododendron 'Mrs. William Watson' (votes 8 for, 3 against), from the Executors of the late Anthony Waterer, Knap Hill. A variety producing good trusses of wide-open white flowers, with pretty reddish markings on the upper segments.

To Rhododendron *myrtilloides* (votes 10 for, 3 against), from Lionel de Rothschild, Esq., Exbury. This delightful species is one of Mr. Kingdon Ward's finds, and it was distributed under his number 3172. It forms a dwarf bush with small shiny green obovate leaves about  $\frac{1}{2}$  inch long, speckled above and pale green below. The pale mauve pendulous campanulate flowers are borne in bunches of about five, and they are about  $\frac{1}{2}$  inch wide. Each flower is carried on a pale green pedicel from  $1\frac{1}{2}$  to 2 inches in length.

To Rhododendron 'Pink Domino' (votes unanimous), from Messrs. J. Waterer, Sons & Crisp, Bagshot. This variety resulted from a cross between *R. discolor* and a hardy hybrid. It bears compact medium-sized trusses of very large open carmine-pink flowers spotted with yellow on the upper segments.

To Rhododendron 'Ted Waterer' (votes unanimous), from Messrs. J. Waterer, Sons & Crisp, Bagshot. This variety bears compact trusses of medium sized, almost flat, white flowers edged with rosy-mauve and spotted with greenish-yellow spots.

*Cultural Commendation.*

To the Director, Cambridge Botanic Garden, for *Sarmienta repens*.

**Other Exhibits.**

Lady Aberconway and Hon. H. D. McLaren, Bodnant: *Meconopsis*, 'F. C. Puddle', *Rhododendron dichroanthum* (A.M. 1924), *R. Wasonii* (pink form), *R. Wiltonii*.

Messrs. C. Elliott, Stevenage: *Primula obliqua*, raised from seed obtained from Darjeeling.

Dame Alice Godman, Horsham: *Datura fastuosa*, *Echinocactus* 'Corderoy.'

Mr. H. Hemsley, Crawley: alpines.

Mr. A. Perry, Enfield: *Linum perenne superbum*.

Mrs. H. Rathbone, Liverpool: Rhododendron 'Norcliffe Scarlet.'

Miss D. H. Moutray Read, Wadhurst: *Aster* sp. B. 15, Mt. Everest Expedition.

Mr. G. Reuthe, Keston: alpines and shrubs.

W. Van de Weyer, Esq., Dorchester: *Buddleia globosa*, early and late varieties, *Buddleia* hybrids (*B. globosa*  $\times$  *B. brasiliensis*), *Laburnum Vossii*  $\times$  *L. vulgare*, *Linaria triornithophora*, *Vinca difformis alba*.

O. E. Warburg, Esq., Epsom: *Drosophyllum lusitanicum*, collected at Algeciras.

FLORAL COMMITTEE, JUNE 23, 1925.

*Section A.*

Mr. H. B. MAY, V.M.H., in the Chair, and twelve other members present.

**Awards Recommended :—**

*Gold Medal.*

- To Messrs. Blackmore & Langdon, Bath, for Delphiniums.
- To Messrs. A. Dickson, Newtownards, for Roses.
- To Messrs. Dobbie, Edinburgh, for Sweet Peas.
- To Messrs. Sutton, Reading, for Sweet Peas.

*Silver-gilt Banksian Medal.*

- To Mr. T. Bones, Cheshunt, for Delphiniums.
- To Messrs. Ladhams, Southampton, for hardy plants.
- To Messrs. McGredy, Portadown, for Roses.
- To Messrs. Prichard, Christchurch, for hardy plants.

*Silver Banksian Medal.*

- To Messrs. Allwood, Haywards Heath, for Carnations.
- To Messrs. Bath, Wisbech, for Pæonies and Delphiniums.
- To Messrs. Barr, Taplow, for Irises, etc.
- To Messrs. Bunyard, Maidstone, for Delphiniums.
- To Messrs. B. R. Cant, Colchester, for Roses.
- To Mr. T. Carlile, Twyford, for Delphiniums.
- To Chalk Hill Nurseries, Reading, for hardy plants.
- To Messrs. Chaplin, Waltham Cross, for Roses.
- To Mr. C. Engelmann, Saffron Walden, for Carnations.
- To Messrs. Kelway, Langport, for Delphiniums and Pæonies.
- To Mr. J. H. Pemberton, Romford, for Roses.
- To Messrs. Waterer, Sons & Crisp, Twyford, for Delphiniums, etc.

*Bronze Banksian Medal.*

- To Mr. J. C. Allgrove, Slough, for hardy plants.
- To Messrs. Burrell, Cambridge, for Delphiniums.
- To Messrs. Godfrey, Exmouth, for Campanulas and Pelargoniums.
- To Messrs. Harkness, Bedale, for hardy plants.
- To Mr. Lilley, Slough, for Roses.
- To Messrs. Lowe & Gibson, Crawley Down, for Delphiniums.
- To Messrs. S. Low, Enfield, for Carnations and other greenhouse plants.

*Award of Merit.*

To *Campanula persicifolia gigantea coronata* 'Shirley' (votes 5 for), from Messrs. Ladhams, Southampton. A very effective hardy herbaceous plant of free-flowering habit. The large wide-open flowers are blue and have a double corolla.

To *Dianthus* 'Giant Flowered Frilled' (votes 8 for), from Messrs. Carter, Raynes Park. A very fine strain of annual *Dianthus* growing about 18 inches high. The colours range from white through various shades of rose to crimson.

To Rose 'Dame Edith Helen' (votes unanimous), from Messrs. A. Dickson, Newtownards. A beautifully scented Hybrid Tea variety. The deep pink flowers are large and of fine form.

To Rose 'Else Poulsen' (votes 6 for), from Messrs. Prior, Colchester. This is a dwarf Polyantha variety raised by Mr. D. G. Poulsen. It is a strong grower and flowers from June until early November in the open. It is also excellent for forcing, is said to be mildew-proof, and grows about 2 feet high. The very pretty single flowers are about 3 inches across, and of a pale pink colour, becoming deeper at the edges.

To Rose 'Lady Worthington Evans' (votes unanimous), from Messrs. A. Dickson, Newtownards. A deep velvety crimson Hybrid Tea variety of nice shape.

To Rose 'Marcia Stanhope' (votes unanimous), from Mr. G. Lilley, Slough. A large white sweetly scented Hybrid Tea of splendid form. The centre of the flower is tinted with apricot.

To Rose 'Mrs. Herbert Nash' (votes unanimous), from Messrs. Chaplin, Waltham Cross. A sweetly scented deep carmine-red Hybrid Tea of large size and nice form.

### Other Exhibits.

Misses Hopkins, Shepperton: hardy plants.

Sir Frederick Lewis, Bt., Hatfield: *Hydrangea hortensis* from China.

Messrs. Lowe & Shawyer, Uxbridge: Carnation 'Lady Margaret Boscawen.'

Messrs. Reamsbottom, West Drayton: Anemones.

### Section B.

Mr. C. T. MUSGRAVE in the Chair, and thirteen other members present.

### Awards Recommended:—

#### *Silver Banksian Medal.*

To Messrs. Tucker, Oxford, for shrubs and alpiners.

To Mr. C. Turner, Slough, for shrubs.

#### *Bronze Banksian Medal.*

To Messrs. L. R. Russell, Richmond, for shrubs and climbers.

To Mr. F. G. Wood, Ashted, for shrubs and alpiners.

#### *Award of Merit.*

To *Acidanthera candida* (votes unanimous), from W. Van de Weyer, Esq., Dorchester. An interesting species from British East Africa, where it grows on the veldt at a height of 5,000 feet above sea level. The bright green leaves are like those of the *Gladiolus*. The long-tubed white flowers having the segments of the limb of an orbicular-ovate shape are very strongly scented, especially in the evening. The slender erect glabrous stems are about 1 to 1½ foot high.

To *Calceolaria pratensis* (votes unanimous), from Sir W. Lawrence, Bt., Dorking. This beautiful species, shown lifted from the open in the garden of the exhibitor, was collected by Herr Goethe in 1924 from the foothills of the Argentine Andes. It grows about 18 inches high, and produces its deep golden-yellow flowers with great freedom. The foliage is flattish.

To *Clematis quinquefoliolata* (votes 11 for), from E. M. Preston, Esq., Hayes. This hardy climber was introduced from Central China by Mr. E. H. Wilson. It bears very strongly scented creamy-white flowers in great abundance.

To *Deutzia scabra latiflora* (votes unanimous), from Hon. Vicary Gibbs, Elstree. A very vigorous variety having larger leaves and flowers than the type. The flowers are white and are borne abundantly.

To *Hemerocallis* 'Winsome' (votes unanimous), from G. Yeld, Esq., Gerrard's Cross. A useful border variety raised by the exhibitor, who has for many years been trying to raise a *Hemerocallis* with round open flowers. The plant is free flowering, and the medium-sized deep yellow flowers, which are more open than those of *H. flava*, stand nicely above the foliage.

To *Ozothamnus rosmarinifolius* (votes 4 for), from Sir William Lawrence, Bt., Dorking, and from Mr. J. C. Allgrove, Slough. This tall upright growing Australian shrub is also known as *Helichrysum diosmaefolium*. It has very small narrow linear leaves and very numerous heads of small creamy-white flowers.

To *Phlomis fruticosa* (votes unanimous), from the University Botanic Garden, Cambridge. This well-known South European shrub is a vigorous evergreen, having its dull green, prominently veined, ovate-lanceolate leaves and the stems covered with grey hairs. The bright yellow stalkless labiate flowers are borne in crowded clusters. The common name of the plant is 'Jerusalem Sage.'

To *Tithonia speciosa* (votes 5 for), from C. Hay, Esq., Hindhead. Although introduced from Mexico in 1833, this attractive half-hardy annual appears to be little known at the present time. The peduncles are single-headed and thickened just below the flower. The ray florets, which number about twelve or thirteen, are fiery red, with orange cadmium reverse. The leaves are petiolate, cordate, undivided or crenately three-lobed. The blooms measure about 3½ inches across.

# IX PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

The following awards recommended to Helianthemums, after trial at Wisley were confirmed :—

## Award of Merit.

*Flowers yellow.*

\*12. *alpestre*, from R.H.S.

\*17. 'St. John's College Yellow,' sent by Mr. W. M. Christy, Emsworth.

*Flowers coppery-orange.*

46. }  
38. } Alike. { 'Fireball,' from R.H.S.  
78. } { 'Rubens,' sent by Mr. H. Hemsley, Crawley.  
      { 'Bronze King,' sent by Messrs. Backhouse, York.

*Flowers copper, centre crimson.*

\*37. 'Chocolate Blotch,' sent by Mr. W. M. Christy.

*Flowers crimson.*

77. 'Ben Lui,' sent by Mr. J. Nicoll, Monifieth, N.B.

*Highly commended.*

*Flowers salmon.*

57. 'Watergate Pink,' sent by Mr. W. M. Christy.

*Flowers rosy-cerise.*

35. 'Jack Scott,' sent by Mr. W. M. Christy.

73. 'Rosy Gem,' sent by Messrs. Baker, Wolverhampton.

*Commended.*

*Flowers yellow.*

9. 'Starlight,' sent by Mr. W. M. Christy.

18, 19. *H. lunulatum*, sent by Messrs. Backhouse and Mr. R. Notcutt, Woodbridge.

*Flowers salmon.*

68, 69. 'Salmon Queen,' sent by Mr. F. G. Wood, Ashted, and Mr. H. Hemsley, Crawley.

*Flowers yellow, centre scarlet.*

\*42. 'Sensation,' sent by Mr. H. Hemsley.

The following awards recommended to Cistuses, after trial at Wisley, were confirmed :—

## Award of Merit.

1. *C. florentinus*, from R.H.S.

13. *C. formosus unicolor*, from R.H.S.

18. *C. purpureus*, from R.H.S.

24. 'Silver Pink,' sent by Messrs. Hillier, Winchester.

37. *C. cyprius*, from R.H.S.

## Other Exhibits.

Mr. J. C. Allgrove, Slough : *Lupinus Paynei* and *L. Paynei rosea*.

Mr. E. Dixon, Putney : shrubs and alpines.

W. A. B. Fletcher, Esq., Bognor : *Cistus cyprius immaculatus*.

Dame Alice Godman, Horsham : *Gladiolus* from Uganda.

L. de Rothschild, Esq., Exbury : *Rhododendron cremnastes*, Farrer 1196.

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\* Award recommended June 2, 1925.



ORCHID COMMITTEE.

JANUARY 13, 1925.

F. J. HANBURY, Esq., V.M.H., in the Chair, and eighteen other members present.

Awards Recommended :—

*Gold Medal.*

To G. F. Moore, Esq., Chardwar, Burton-on-the-Water, Gloucestershire, for group of excellent *Cypripediums*.

*Silver-gilt Banksian Medal.*

To H. T. Pitt, Esq., Rosslyn, Stamford Hill, for group of species and hybrids.

*Silver Banksian Medal.*

To Messrs. Cowan, Southgate, for group of Orchids.

To Messrs. Cypher, Cheltenham, for group of Orchids.

*First-class Certificate.*

To *Cypripedium* × 'Gwen Hannan' var. 'Field-Marshal' ('Florence Spencer' × 'Christopher' var. 'Grand Duke Nicholas') (votes unanimous), from G. F. Moore, Esq., Chardwar, Bourton-on-the-Water, Gloucestershire. One of the finest forms of this hybrid. Of immense size, the broadly developed dorsal sepal pure white, except for a small greenish area at the base, and with a few lines of purple dots; petals and labellum honey-yellow, lightly tinged with brown.

*Award of Merit.*

To *Cypripedium* × 'Stamperland' var. 'Alpha' ('Glorita' × 'Christopher' var. 'Grand Duke Nicholas') (votes unanimous), from R. Paterson, Esq., Stamperland, Cathcart, Glasgow. A finely formed flower, well above the average size, the large dorsal sepal greenish, with white upper part, and evenly marked with purple spots; labellum large, and, with the petals, yellowish, stained with crimson-rose.

To *Cypripedium* × *Worsleyi* ('Hestia' × 'Lady Dillon') (votes unanimous), from H. Worsley, Esq., Stonehouse, Haslingden, Lancs. A large flower in which the dorsal sepal is evenly spotted on a white ground, the base greenish, petals and labellum broadly developed, the former with brownish-red markings.

To *Cypripedium* × 'Mrs. Eley' var. 'Derrick' ('Commodore' × 'Christopher' var. 'Grand Duke Nicholas') (votes unanimous), from G. F. Moore, Esq., Chardwar, Bourton-on-the-Water, Gloucestershire. Dorsal sepal orbicular in shape, the lower part greenish, the upper white, petals and labellum yellowish, marked with brown lines and spots.

To *Laeliocattleya* × 'Pepita' var. *splendens* ('St. Gothard' × *Colmaniana*), (votes 10 for, 2 against), from Messrs. Cowan, Southgate. Flowers compactly formed, of deep mauve-pink colour; the labellum purple and with the margin crisped.

*Cultural Commendation.*

To *Cypripedium* × *Leeanum* var. *Clinkaberryanum*, from Mr. Harry Dixon, Spencer Park Nursery, Wandsworth Common. A robust example of this well-known hybrid, with 16 flowers.

**Other Exhibits.**

Messrs. Flory & Black, Slough: varieties of *Cypripedium* × 'Golden Wren' of bright yellow colour.

Messrs. Sanders, St. Albans: *Cypripedium insigne* var. 'Pavlova,' of clear light greenish colour.

Messrs. A. J. Keeling: *Cypripedium* × 'Amita,' of light greenish yellow colour.

H. Worsley, Esq., Stone House, Haslingden, Lancs: *Cypripedium* × 'Kethar,' with an attractive dorsal sepal.

## lxii PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

R. Gerrish, Esq., Milford Manor, Salisbury: *Odontioda* × 'Valda,' of rose-pink colour.

J. J. Bolton, Esq., Claygate, Surrey: *Odontioda* × 'Colinge' var. 'Redstart'; large flowers, blotched with reddish-brown.

Messrs. Armstrong & Brown, Tunbridge Wells: *Cypripedium* × 'Mrs. Eley.'

Messrs. J. & A. McBean, Cooksbridge: *Odontonia* × 'Ceres,' with large flowers, yellow, marked with red-brown.

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### ORCHID COMMITTEE, JANUARY 27, 1925.

C. J. LUCAS, Esq., in the Chair, and fifteen other members present.

#### Awards Recommended:—

##### *Silver-gilt Banksian Medal.*

To Messrs. Sanders, St. Albans, for group of species and hybrids.

##### *Silver Banksian Medal.*

To H. T. Pitt, Esq., Rosslyn, Stamford Hill, for group of interesting Orchids.

To Messrs. Stuart Low, Jarvisbrook, Sussex, for exhibit of *Odontoglossums* and *Odontiodas*.

##### *First-class Certificate.*

To *Cypripedium* × 'Mrs. William Pickup' ('Alcibiades' × 'Thisbe') (votes unanimous), from Dr. Craven F. Moore, Victoria Park, Manchester. A large and attractive flower, the dorsal sepal flushed with deep rose, tinged with brown on the basal area, the upper part white, and with the margin crisped; petals and labellum yellow, stained with red-brown.

##### *Award of Merit.*

To *Brassocattleya* × 'Bianca' var. 'Auramine' (*B.-c.* × 'The Baron' × *C. Mendelii*) (votes 8 for, 1 against), from Messrs. McBean, Cooksbridge, Sussex. This handsome hybrid bore two large flowers, the segments white, slightly tinged with pink, the labellum having the margin deeply fringed and the throat yellowish.

To *Odontonia* × 'Nesta' (*Odontonia* × 'Gladys' × *Odontoglossum* × 'St. George') (votes unanimous), from Messrs. Charlesworth, Haywards Heath. The erect spike bore three flowers of medium size, the labellum broadly developed, and all the segments marked with crimson-rose blotching.

To *Odontoglossum* × 'Ceramic' (*Watsonii* × *eximium*) (votes unanimous), from Messrs. Charlesworth, Haywards Heath. The spike bore fourteen flowers, well above the average size, the sepals yellowish, the petals white, and both blotched with chocolate-red; labellum similarly coloured.

#### Other Exhibits.

Messrs. J. & A. McBean: *Lycaste Skinneri alba*, with six flowers.

Messrs. Flory & Black: varieties of *Cypripedium* 'Golden Wren.'

Sir Arthur Watson, C.B.E., Dollis Avenue, Finchley: *Lycaste Skinneri*, with eleven flowers and buds.

Messrs. Cowan: *Brassocattleya* × 'British Queen,' of attractive qualities.

W. R. Fasey, Esq., Snaresbrook: *Odontioda* × 'Colinge,' with a spike of fourteen flowers of scarlet tint.

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### ORCHID COMMITTEE, FEBRUARY 10, 1925.

Sir JEREMIAH COLMAN, Bt., in the Chair, and twenty-two other members present.

#### Awards Recommended:—

##### *Gold Medal.*

To Lieut.-Col. Sir George Holford, K.C.V.O., Westonbirt, Tetbury, Glos, for a magnificent group of *Cymbidium* hybrids.

*Silver-gilt Lindley Medal.*

To Mr. H. G. Alexander, Orchid-grower to Sir George Holford, for excellence of *Cymbidium* cultivation.

*Silver-gilt Banksian Medal.*

To Messrs. Sanders, St. Albans, for exhibit of *Cymbidiums*, *Miltonias*, and other Orchids.

To Messrs. Charlesworth & Co., Haywards Heath, for group of species and hybrids.

*Silver Banksian Medal.*

To Messrs. J. & A. McBean, Cookebridge, Sussex, for exhibit of species and hybrids.

To Messrs. Cowan & Co., Southgate, for group of *Cymbidiums* and *Cypripediums*.

To Messrs. Flory & Black, Slough, for *Cypripediums* in variety.

To Messrs. Stuart Low & Co., Jarvisbrook, Sussex, for group of *Odontoglossums* and rare species.

*First-class Certificate.*

To *Cymbidium* × 'Goosander' (*insigne* × 'Merlin') (votes unanimous), from Lieut.-Col. Sir George Holford, K.C.V.O., Westonbirt, Tetbury, Glos. A charming hybrid. The tall spike bore eleven flowers of delicate pink tinge, the labellum having the front and side lobes suffused with rose, the column similarly coloured.

To *Cypripedium* × 'Memoria F. M. Ogilvie' var. 'Rex' (votes 17 for), from Messrs. Armstrong & Brown, Tunbridge Wells. A large flower, with all the segments above the average size and effectively coloured. Dorsal sepal white, greenish at base, and marked with bold spotting of dark purple colour, petals and labellum yellowish shaded with red-brown.

*Award of Merit.*

To *Miltonia* × 'Wm. Pitt, Stamperland var.' (votes unanimous), from Robert Paterson, Esq., Cathcart, Glasgow. The young plant bore a spike of four flowers, in habit resembling the well-known form of *M. vexillaria*, but of rich crimson-red colour, except for a small yellowish area at the base of the labellum.

To *Cypripedium* × 'Gold Mohur' ('Goliath' × 'Lady Dillon') (votes 17 for), from G. F. Moore, Esq., Chardwar, Bourton-on-the-Water, Glos. A roundly formed flower, the dorsal sepal of deep amber-yellow colour, with some blackish spotting, the margin boldly undulated, the petals brownish and with a bright sheen.

To *Cattleya* × 'Caroline' var. *splendens* (*Percivaliana* × 'Enid') (votes 15 for), from Messrs. J. & A. McBean, Cookebridge, Sussex. This plant bore a compact spike of five flowers, rosy-mauve in colour, the large labellum of bright purple.

To *Cymbidium* × 'Redstart' var. 'Crimson Lip' ('Dryad' × *Pauwelsii*) (votes unanimous), from Lieut.-Col. Sir George Holford, K.C.V.O., Westonbirt, Tetbury, Glos. A pleasing hybrid which bore a spike of twelve large flowers of rose-pink tinge, the labellum having the front lobe blotched with crimson-rose.

To *Cymbidium* × 'Butterfly,' Westonbirt var. (votes unanimous), from Lieut.-Col. Sir George Holford. This plant carried a spike of twenty-four large flowers of yellowish colour, the labellum marked with crimson-red.

To *Cymbidium* × 'Warbler,' Westonbirt var. (votes 8 for, 3 against), from Lieut.-Col. Sir George Holford. Flowers of light greenish yellow, delicately shaded, the widely developed labellum having the main area white, with a few crimson lines and spots.

To *Cymbidium* × 'Curlew,' Westonbirt var. (votes 5 for), from Lieut.-Col. Sir George Holford. The spike bore eleven flowers of yellowish colour tinged with green, the labellum blotched and lined with crimson.

To *Cymbidium* × 'Lapwing' var. *roseum* (votes 7 for, 1 against), from Lieut.-Col. Sir George Holford. A pretty hybrid with a spike of seventeen flowers of rose colour, the labellum tinged with brown and spotted with crimson-red.

**Other Exhibits.**

Sir Jeremiah Colman, Bt., Gatton Park, Surrey: *Cymbidium* × 'Erin' (*gationense* × *grandiflorum*), with large greenish flowers; also several varieties of *Laeliocattleya* × 'Champagne.'

lxiv PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

R. Gerrish, Esq., Milford Manor, Salisbury: *Odontoglossum* × 'Leander,' to which an Award of Merit had been previously given.

Baron Bruno Schröder, Englefield Green, Surrey: several finely grown spikes of *Calanthe* × 'Baron Schröder.'

Robert Paterson, Esq., Stamperland, Cathcart, Glasgow: *Cypripedium* × 'J. M. Black' and *Odontoglossum* × 'Bonar Law.'

G. F. Moore, Esq., Chardwar, Bourton on the Water, Glos.: several meritorious *Cypripedium* hybrids.

ORCHID COMMITTEE, FEBRUARY 24, 1925.

F. J. HANBURY, Esq., V.M.H., in the Chair, and fifteen other members present.

Awards Recommended:—

*Silver Banksian Medal.*

To H. T. Pitt, Esq., Rosslyn, Stamford Hill, for exhibit containing thirty plants of *Epidendrum Endresto-Wallisii*.

To F. J. Hanbury, Esq., Brockhurst, East Grinstead, for group of *Dendrobium* hybrids.

To Messrs. Sanders, St. Albans, for group of species and hybrids.

To Messrs. Stuart Low, Jarvisbrook, for exhibit of Orchid hybrids.

To Messrs. Flory & Black, Slough, for group of *Cattleyas* and *Cypripediums*.

*Award of Merit.*

To *Laeliocattleya* × 'Sheila Beddington' (L.-c. × 'Britannia' × C. × 'Clotho') (votes 13 for), from Sir Herbert S. Leon, Bt., Bletchley Park, Bucks. Flowers large, petals broadly developed, of light rose colour, the labellum rich purple, crisped at the margin, and with the throat yellow.

To *Cymbidium* × 'Redshank' (*insigne* × 'Redstart') (votes unanimous), from Lieut.-Col. Sir George Holford, K.C.V.O., Westonbirt, Tetbury. The spike bore eight white flowers, the labellum having the side lobes lined with crimson and with a suffusion of similar colour on the front lobe.

To *Cypripedium* × 'Robert Paterson' var. 'Brilliance' ('Eurybiades' × 'Memoria F. M. Ogilvie') (votes 9 for), from Messrs. Flory & Black, Slough. The dorsal sepal of this flower is white profusely marked with confluent spotting of crimson colour, and with a dark purplish vertical line in the centre; petals broad, and, with the labellum yellowish, stained with mahogany-red.

To *Dendrobium* × 'Miss Florence E. King' (*nobile nobilius* × 'Artemis') (votes 12 for, 1 against), from F. J. Hanbury, Esq., Brockhurst, East Grinstead. An elegant hybrid in the *nobile* section; of deep purple colour with a crimson tinge, labellum with an intense crimson blotch on the basal area, around which is a narrow whitish border, the apex purplish.

Other Exhibits.

Messrs. Cowan, Southgate: two fine examples of *Brassocattleya* × 'British Queen,' as well as of *Cattleya* × 'Tityus.'

Messrs. J. & A. McBean, Cooksbridge, Sussex: *Cattleya* × 'Empress Frederick,' with flowers of deep rose-purple colour.

Baron Bruno Schröder, Englefield Green, Surrey: cut flowers of *Sophrolaeliocattleya* × 'Prince Hirohito,' of ruby-crimson colour.

Geo. Wm. Bird, Esq., The Manor House, West Wickham, Kent: *Odontioda* × 'Rufus' var. 'Wickham Beauty,' to which an Award of Merit had been previously given.

R. Gerrish, Esq., Milford Manor, Salisbury: *Odontioda* × 'Lerna,' with flowers of chocolate-red colour, the lip margined with white.

ORCHID COMMITTEE, MARCH 10, 1925.

C. J. LUCAS, Esq., in the Chair, and twenty other members present.

Awards Recommended:—

*Gold Medal.*

To Messrs. J. & A. McBean, Cooksbridge, Sussex, for a splendid exhibit of various Orchids.

*Silver-gilt Banksian Medal.*

To Lieut.-Col. Sir George Holford, K.C.V.O., Westonbirt, Tetbury, for exhibit of choice *Cymbidium* hybrids.

To Messrs. Sanders, St. Albans, for *Cymbidium* hybrids and other Orchids.

To Messrs. Charlesworth, Haywards Heath, for well-flowered *Odontoglossums*.

*Silver Banksian Medal.*

To Col. Stephenson R. Clarke, C.B., Borde Hill, Cuckfield, Sussex: group of *Dendrobium* species and hybrids.

To H. T. Pitt, Esq., Rosslyn, Stamford Hill: interesting species and hybrids.

To Messrs. Cowan, Southgate: *Brassocattleyas* and *Cymbidiums*.

To Messrs. Stuart Low, Jarvisbrook, Sussex: attractive hybrids.

*First-class Certificate.*

To *Miltonia* × 'Beau Brummell,' Pitt's var. (votes 13 for, 1 against), from H. T. Pitt, Esq., Rosslyn, Stamford Hill. A pretty form of this hybrid between *M.* × 'Venus' and *M.* × *Bleuana* var. 'Reine Elisabeth.' The spike bore a couple of flowers, deep rose-purple, the labellum freckled with light spotting.

*Cymbidium* × 'Flamingo' *roseum* ('Merlin' × *Alexanderi*) (votes 9 for, 4 against), from Lieut.-Col. Sir George Holford, K.C.V.O., Westonbirt, Tetbury. The erect spike bore four large flowers with the segments flatly displayed and broadly developed. Of light blush-rose tint, the labellum having light crimson markings, the column deep rose colour.

*Award of Merit.*

To *Cymbidium* × 'Miranda,' Westonbirt var. (*Alexanderi* × *Lowio-grandiflorum*) (votes 9 for, 1 against), from Lieut.-Col. Sir George Holford. The spike bore twenty-one large yellowish flowers, the white labellum having crimson-red lines on the side lobes and a blotch of similar colour on the front lobe.

To *Cymbidium* × 'Bullfinch' var. 'Brilliant' (*Alexanderi* × 'Garnet') (votes unanimous), from Lieut.-Col. Sir George Holford. The spike bore seven flowers, of yellowish colour, but almost covered with terra-cotta suffusion and reddish-rose line, the labellum white with the front lobe crimson.

To *Cymbidium* × 'Tityus' (*Woodhamsianum* × *insigne*) (votes 11 for, 4 against), from Messrs. Armstrong & Brown, Tunbridge Wells. The spike carried sixteen creamy-white flowers, the labellum effectively marked with crimson-red spots.

To *Cattleya* × 'Jupitus' ('Edith' × 'Tityus') (votes 8 for, 4 against), from Messrs. J. & A. McBean, Cooksbridge, Sussex. Flowers compactly formed, the broadly developed segments crisped at the margin, rose-purple, the labellum much darker.

To *Cymbidium* × *Alexanderi*, Overlea var. (votes 9 for, 2 against), from Messrs. J. & A. McBean, Cooksbridge, Sussex. This plant bore two arching spikes with a total of nineteen flowers, blush-pink, the labellum having a few reddish markings and the column rose-tinted.

To *Laeliocattleya* × 'H. T. Pitt' var. *superba* (*C.* × 'Enid' × *L.-c.* × 'Bella') (votes unanimous), from Messrs. Flory & Black, Slough. Flower of fine formation, rosy-mauve, the expansive front lobe of the labellum crimson and with a yellowish disc on each of the side lobes.

*Preliminary Certificate.*

To *Odontoglossum* × 'Mirida' ('Ida' × 'Mars') (votes unanimous), from Messrs. J. & A. McBean, Cooksbridge, Sussex. An immature seedling with a couple of large flowers, white ground, blotched with purple-brown.

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ORCHID COMMITTEE, MARCH 24, 1925.

C. J. LUCAS, Esq., in the Chair, and thirteen other members present.

**Awards Recommended:—**

*Silver Banksian Medal.*

To Messrs. Sanders, St. Albans, for exhibit of Orchids.

To Messrs. Stuart Low, Jarvisbrook, Sussex, for group of species and hybrids.

#### *Preliminary Commendation.*

To *Odontioda* × 'Viscountess Folkestone' (*Oda.* × 'Coronation' × *Odm.* × 'l'Empereur') (unanimous), from R. Gerrish, Esq., Milford Manor, Salisbury. This promising hybrid bore a single flower of perfect formation, of deep violet-rose colour, with chocolate-coloured blotching on the central area of each segment, the elongated labellum having a bright yellow spiny crest.

#### **Other Exhibits.**

Messrs. A. J. Keeling & Sons, Bradford: *Dendrobium Ashworthiae*, with a spike of nine flowers, as well as other species and hybrids.

Harry Worsley, Esq., Haslingden, Lancs: *Odontoglossum* × *crispo-Solon* var. 'Ruth,' with finely developed flowers.

Baron Bruno Schröder, Englefield Green: *Odontioda* × 'The Dell Duchess,' with a spike of fourteen medium-sized flowers prettily marked with scarlet, and to which an Award of Merit had been given on a previous occasion.

Messrs. Flory & Black, Slough: a novelty in *Odontoglossum* × 'Falstaff' ('Portia' × *eximillus*).

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#### ORCHID COMMITTEE, APRIL 7, 1925.

Sir JEREMIAH COLMAN, Bt., in the Chair, and sixteen other members present.

#### **Awards Recommended:—**

##### *Gold Medal.*

To R. Gerrish, Esq., Milford Manor, Salisbury, for a superb group of hybrid Orchids.

To Messrs. J. & A. McBean, Cooksbridge, Sussex, for an extensive exhibit of choice species and hybrids.

##### *Silver-gilt Banksian Medal.*

To Messrs. Charlesworth for an attractive exhibit of hybrids.

##### *Silver Banksian Medal.*

To H. T. Pitt, Esq., Rosslyn, Stamford Hill, for an exhibit in which choice species were included.

To Messrs. Sanders, St. Albans, for a group of *Cymbidiums*.

##### *Bronze Banksian Medal.*

To Mr. Harry Dixon, Wandsworth Common, for a group containing a fine example of *Brassocattleya* × *Digbyano-Mendelii*, and the scarce *Renanthera Imschootiana*.

##### *Award of Merit.*

To *Odontoglossum* × 'Clodagh' (*Lakiniæ* × 'Nathaniel') (votes 12 for), from R. Gerrish, Esq., Milford Manor, Salisbury. The spike bore six flowers, the segments well covered with chocolate-red blotching, the broad labellum showing more of the white ground than the other segments.

To *Odontoglossum* × 'Cordoba' (*eximium* × 'Doris') (votes 12 for, 1 against), from R. Gerrish, Esq., Milford Manor, Salisbury. The spike bore eleven flowers, compactly arranged, of almost solid reddish blotching, the labellum bordered with white.

To *Cymbidium* × 'Vesta' var. 'Thelma' (*Alexanderi* × *insigne*) (votes 10 for, 2 against), from Messrs. J. & A. McBean, Cooksbridge, Sussex. A pretty hybrid; the arching spike carried nine large flowers of blush-pink colour, the labellum lined and dotted with crimson, the column deep rose.

#### **Other Exhibits.**

Messrs. Cowan, Southgate: *Odontioda* × 'Murillo,' with large flowers of reddish colour, also *Odontioda* × 'King George V.,' with a many-flowered spike.

Messrs. Flory & Black, Slough: *Cattleya* × 'Dr. M. Lacroze,' and *Laelio-cattleya* × 'Pavlova,' of deep-mauve colour.

ORCHID COMMITTEE, APRIL 21, 1925.

Sir JEREMIAH COLMAN, Bt., in the Chair, and fifteen other members present.

MR. DE BARRI CRAWSHAY.—The Chairman referred sympathetically to the death of Mr. de Barri Crawshay, who became a member of the Committee in the early part of 1890 and continued until the end of 1921, and whose knowledge of Orchids had always been of considerable value to the Committee. It was unanimously resolved that a vote of sympathy be sent to his only surviving son, Mr. Raymond Crawshay.

Awards Recommended :—

*Silver Banksian Medal.*

To Messrs. Charlesworth, Haywards Heath, for exhibit of various hybrids.

*Bronze Banksian Medal.*

To Messrs. Stuart Low, Jarvisbrook, Sussex, for group of attractive species.

*First-class Certificate.*

To *Odontioda* × 'Orestes' var. 'Butterfly' (*Oda.* × 'Coronation' × *Odm.* × *perculthum*) (votes 12 for), from J. J. Bolton, Esq., Claygate, Surrey. This hybrid bore a spike of seventeen medium-sized flowers, blotched with bright reddish-scarlet, the petals having an additional zone of similar colour near the margin; labellum with a whitish apex.

*Award of Merit.*

To *Laeliocattleya* × 'Orange Blossom' var. *magnifica* (*L.-c.* × 'Elinor' × *L.-c.* × 'Trimyra') (votes 12 for), from Lieut.-Col. Sir George Holford, K.C.V.O., Westonbirt, Tetbury.

To *Cattleya Schroederae* var. 'Hercules' (votes 10 for), from Messrs. Stuart Low, Jarvisbrook, Sussex. A plant which has been cultivated for many years in European collections, but not seen at its best until the present occasion. The spike bore three large flowers with broadly developed white segments, the labellum having an orange-coloured zone on its middle area.

Other Exhibits.

Baron Bruno Schröder, Englefield Green, Surrey: two magnificent examples of *Dendrobium* × *Thwaitesiae*, each bearing nearly sixty flowers of golden-yellow colour; also *Dendrobium* × 'Model,' with flowers of excellent formation and colour.

George Wm. Bird, Esq., The Manor House, West Wickham, Kent: *Odontioda* × 'Madeline,' with a spike of six large flowers, the roundly formed segments having the central areas of solid reddish blotching.

Messrs. Flory & Black, Slough: a novelty in *Laeliocattleya* × 'Montrose' (*C.* × 'Enid' × *L.-c.* × 'Pizarro'), with three large flowers of rose-pink colour.

J. J. Bolton, Esq., Claygate, Surrey: *Odontoglossum* × 'Exworth,' with a spike of twelve flowers of reddish colour.

Messrs. Cowan, Southgate: *Miltonia* × *Bleuana* var. 'Reine Elisabeth,' also *Brassocattleya* × 'Apollo,' of large size and deep rose colour.

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ORCHID COMMITTEE, MAY 5, 1925.

Sir JEREMIAH COLMAN, Bt., in the Chair, and eighteen other members present.

Awards Recommended :—

*First-class Certificate.*

To *Odontoglossum* × 'White Admiral' (votes 13 for, 2 against), from Lieut.-Col. Sir George Holford, K.C.V.O. The full spike bore ten large flowers, thick in texture, segments broadly developed, white, except for a slight rose tint on the two lateral sepals and an oblong blotch of crimson on the central area of the labellum. Parentage unrecorded.

To *Miltonia* × 'Princess Mary,' Stamperland variety (votes unanimous), from Robert Paterson, Esq., Stamperland House, Cathcart, Glasgow. The spike bore five large flowers having the sepals flushed with crimson-rose, the petals to a more extensive degree, the labellum with a brownish mask near its base.

To *Odontoglossum* × 'Eldorado' (*eximium* × *Lakiniæ*) (votes 15 for), from Messrs. Stuart Low. A showy hybrid with a spike of seven flowers, the segments symmetrically marked with reddish-brown, the labellum with a bright yellow crest of spiny nature.

To *Odontoglossum* × 'Fabia' var. 'Sir Christopher Wren' (votes 14 for, 2 against), from J. J. Bolton, Esq., Claygate, Surrey. Flowers of medium size, of crimson-red colour, equally suffused, except for a narrow white margin.

To *Sophrolaeliocattleya* × 'St. Gothard' (*S. grandiflora* × *L.-c.* × 'St. Gothard') (votes unanimous), from J. J. Bolton, Esq., Claygate, Surrey. The single flower large for its kind, and of blood-red colour throughout all the segments.

#### Cultural Commendation.

To *Lissochilus streptopetalus* (votes 11 for), shown by Wm. Van de Weyer, Esq., Clyffe House, Dorchester. Two well-grown plants of this species from British East Africa were staged, each bearing a couple of spikes, with numerous flowers and buds.

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#### CHELSEA SHOW, MAY 19, 1925.

Sir JEREMIAH COLMAN, Bt., in the Chair, and twenty other members present.

For Cups and Medals awarded by the Council, see p. xxiii.

#### Awards Recommended :—

##### First-class Certificate.

To *Laeliocattleya* × *Hassallii alba*, Cowan's var. (*L.-c.* × 'Britannia' × *C. Warszewiczii*) (votes unanimous), from Messrs. Cowan. One of the finest forms of this hybrid. Sepals and petals of thick texture, creamy-white, the roundly formed labellum bright purple with a narrow white margin.

To *Odontioda* × 'Hiawatha' var. 'Royalty' (*Oda.* × *Charlesworthii* × *Oda.* × 'Coronation') (votes 16 for), from Messrs. Charlesworth. The spike bore eleven flowers of rose tint, the sepals and petals heavily blotched with brilliant rose-scarlet.

##### Award of Merit.

To *Cattleya* × 'Chelsea' ('Empress Frederick' × 'General Pulteney') (votes unanimous), from Messrs. Flory & Black. Flower with broadly developed segments of erect habit, deep mauve, the large labellum crimson-purple, crisped at the margin.

To *Cymbidium* × 'Virgo' var. 'Guinea' (*Pauwelsii* × *Woodhamsianum*) (votes unanimous), from Messrs. Stuart Low. This plant bore an extended spike of eighteen large flowers of greenish-gold colour, the labellum with a crimson band on the apex of the front lobe and spotting of similar colour on each of the two lateral lobes.

To *Odontoglossum crispum* var. 'Priscilla' (votes 7 for, 2 against), from Robert Paterson, Esq., Stamperland House, Cathcart, Glasgow. The spike had been restricted to four flowers, which were large, the petals unusually developed, sepals slightly rose tinted, the labellum having a few reddish spots.

To *Odontioda* × 'Orestes' var. *majestica* (*Oda.* × 'Coronation' × *Odm.* × *percultum*) (votes 11 for, 2 against), from Messrs. Cowan, Southgate. This hybrid carried seven large flowers with roundly formed segments of rose tint, slightly marked with reddish-purple.

To *Miltonia* × 'Princess Mary' var. *majalis* (*Bleuana* × *Hyeana*) (votes 11 for), from Messrs. Charlesworth, Haywards Heath. Spike of four flowers, of typical vexillaria habit, sepals flushed with crimson at the base, the petals to a greater extent and with slightly deeper colour, labellum stained with violet-rose, and with a ray-like mask.

To *Cymbidium* × 'Victrix' ('Venus' × *Alexanderi*) (votes unanimous), from Messrs. Sanders, St. Albans. This plant bore two spikes of large buff-yellow flowers, the labellum having a brownish zone around the apex of the front lobe.



*Cultural Commendation.*

To *Odontioda* 'Cora' var. 'Princess' (*Oda.* × 'Coronation' × *Odm.* × *eximium*) (votes unanimous), from Messrs. Charlesworth. Spike of nineteen large flowers of rose tint, the central area of each segment spotted with light red.

To *Odontioda* × 'West Point Beauty' (*Oda.* × *Bradshawiae* × *Odm.* × *eximium*) (votes unanimous), from Messrs. Charlesworth. The inflorescence bore seventy-six well-developed flowers of purplish-rose colour.

ORCHID COMMITTEE, JUNE 9, 1925.

Sir JEREMIAH COLMAN, Bt., in the Chair, and thirteen other members present.

**Awards Recommended:—***Silver Banksian Medal.*

To Messrs. Sanders, St. Albans, for group of various Orchids.

*Bronze Banksian Medal.*

To Messrs. Stuart Low, Jarvisbrook, for group of various hybrids.

*Vote of Thanks.*

To Sir Jeremiah Colman, Bt., Gatton Park, Surrey, for exhibit of rare species.

*Award of Merit.*

To *Odontoglossum crispum* var. 'Renown' (votes 10 for), from J. J. Bolton, Esq., Claygate, Surrey. A garden-raised plant with a spike of six large flowers, the white segments broadly developed, the labellum having a crimson blotch on the central area.

To *Miltonia vexillaria* var. 'Rajah' (votes 12 for, 2 against), from Messrs. Flory & Black, Slough. Flower rose-tinted and bearing on the labellum an unusually large blotch of dark crimson colour. A garden-raised plant obtained by crossing *M. vexillaria* var. 'G. D. Owen' with a variety of *M. vexillaria* having radiating lines of colour on the base of the labellum.

*Preliminary Commendation.*

To *Odontioda* × 'Opal,' Gerrish's var. (*Oda.* × *Cooksoniae* × *Odm.* × 'Eximillus'), from R. Gerrish, Esq., Milford Manor, Salisbury. A promising seedling with a single flower of deep rose tint, the segments heavily blotched with reddish-scarlet, the labellum of a deeper colour and with a reddish blotch near the yellow crest.

*Cultural Commendation.*

To Mr. J. T. Barker, Orchid-grower to Sir Herbert S. Leon, Bt., Bletchley Park, Bucks, for *Cattleya* × 'Queen Mary' (*Mendelii alba* × *Warneri alba*) (votes 11 for), with six spikes and a total of sixteen flowers, white, except for some orange-yellow in the tube of the labellum.

**Other Exhibits.**

Mrs. Menteith Ogilvie, Kensington, W.: *Laelia* × 'Pacavia' and two *Laelio-cattleyas*.

Sir Herbert H. Leon, Bt., Bletchley Park: *Laeliocattleya* × 'Victrix,' of light blush colour, the petals flushed and striated with purple, the labellum rich ruby-purple.

Messrs. Flory & Black: five examples of *Miltonia vexillaria* var. 'Doris,' raised from seed, and of floriferous nature.

Messrs. Cowan: *Brassolaeliocattleya* × 'Jupiter,' with large flowers of rosy-mauve colour.

ORCHID COMMITTEE, JUNE 23, 1925.

Sir JEREMIAH COLMAN, Bt., in the Chair, and eleven other members present.

**Awards Recommended:—***Silver Banksian Medal.*

To Messrs. Sanders, St. Albans, for attractive group of Orchids.

*Bronze Banksian Medal.*

To Messrs. Stuart Low, Jarvisbrook, for exhibit of species and hybrids.

*Award of Merit.*

To *Laeliocattleya* × 'Beatrice de Herriard' (*C.* × 'Veiris' × *L.-c.* × 'Ettrick') (votes 9 for), from Mrs. Beatrice Jervoise, Herriard Park, Basingstoke. An elegant hybrid inheriting the formation of the former parent. Sepals and petals yellowish, the labellum having the front lobe stained with ruby-crimson, the apical margin cream-coloured.

*Preliminary Commendation.*

To *Odontoglossum* × *eximium* var. 'Gatton Triumph' (*crispum solum* × *ardentissimum* var. 'J. Gurney Fowler') (votes unanimous), from Sir Jeremiah Colman, Bt., Gatton Park, Surrey. An interesting result in which the well-known coloration on the labellum of the former parent is perpetuated, and in a slightly brighter tint. The sepals bear an occasional circular blotch of crimson-purple, while each sepal has a narrow zone of similar colour on its extreme base. Thirty seedlings have so far flowered from this batch, but, with this one exception, all have reverted to the typical form of an almost unspotted *O.* × *eximium*.

To *Odontoglossum* × 'Lady Holmden' ('Lord Pirrie' × 'Amethyst') (votes unanimous), from Sir Jeremiah Colman, Bt., Gatton Park, Surrey. The segments of this promising seedling are well formed and almost entirely covered with chocolate-purple colour, the elongated labellum bearing a dark crimson blotch, and with the apical area white.

To *Odontoglossum* × 'Lady Colman' (*Lambeauianum* × 'V.C.') (votes unanimous), from Sir Jeremiah Colman, Bt., Gatton Park, Surrey. This immature plant bore a single flower of large size and massive formation, white, slightly rose-tinted, all the segments with dark crimson blotching, the roundly formed labellum bearing a yellow crest.

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AMATEUR FLOWER SHOW, JUNE 30, 1925.

The Orchid Committee did not sit on this occasion.

**Awards Recommended :—**

*Gold Medal.*

To Sir Jeremiah Colman, Bt., Gatton Park, Surrey, for an excellent exhibit of Orchids and other plants.

*Silver-gilt Banksian Medal.*

To H. T. Pitt, Esq., Rosslyn, Stamford Hill, N., for an interesting exhibit of Orchid species and hybrids.

**Other Exhibits.**

In the class for 12 Orchids H. T. Pitt, Esq., received the first prize. In the class for 6 Orchids the first prize went to A. T. Sutton, Esq., Oldfield House, Ditchling, Sussex, and the second prize was won by A. M. Gentle, Esq., The Capstone, St. Albans.

## NARCISSUS AND TULIP COMMITTEE.

FEBRUARY 10, 1925.

Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, and thirteen other members present.

**Award Recommended :—***Bronze Banksian Medal.*

To Messrs. Barr, Covent Garden, for Daffodils.

NARCISSUS AND TULIP COMMITTEE, FEBRUARY 24, 1925.

Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, and eighteen other members present.

**Awards Recommended :—***Silver-gilt Banksian Medal.*

To Messrs. R. H. Bath, Wisbech, for bulbs in bowls.

*Bronze Banksian Medal.*

To Messrs. Barr, Covent Garden, for Daffodils.

NARCISSUS AND TULIP COMMITTEE, MARCH 10, 1925.

Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, and fifteen other members present.

**Awards Recommended :—***Silver-gilt Banksian Medal.*

To Messrs. J. R. Pearson, Lowdham, for Daffodils.

*Silver Banksian Medal.*

To Messrs. R. H. Bath, Wisbech, for Daffodils and other bulbs.

To Messrs. Barr, Covent Garden, for Daffodils.

*Bronze Banksian Medal.*

To Messrs. Cartwright & Goodwin, Kidderminster, for Daffodils.

*Award of Merit.*

To *Narcissus* 'Godolphin,' for market purposes (votes 9 for, 1 against) and for garden purposes (votes 10 for, 0 against), from Mr. P. D. Williams, St. Keverne. A self soft-yellow Trumpet variety, Division I. (a). The flowers are bold, with the inner three of the broad perianth pieces slightly twisted and the trumpet slightly frilled at the mouth. Raised by Mr. P. D. Williams.

To *Narcissus* 'Medusa,' for market purposes (votes unanimous) and for garden purposes (voting *nem. con.*), from Mr. P. D. Williams. A Tazetta variety, Division VIII., bearing on each stem one or two flowers, but very rarely more. The flowers are of medium size with a pure white perianth and fiery-scarlet rather flat cup. Raised by Mr. P. D. Williams.

NARCISSUS AND TULIP COMMITTEE, MARCH 24, 1925.

Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, and eighteen other members present.

**Awards Recommended :—***Gold Medal.*

To Messrs. Sutton, Reading, for Tulips.

*Silver-gilt Banksian Medal.*

To Messrs. Barr, Covent Garden, for Daffodils.  
To Messrs. J. R. Pearson, Lowdham, for Daffodils.  
To Messrs. R. H. Bath, Wisbech, for Tulips, etc.

*Silver Banksian Medal.*

To Messrs. Dobbie, Edinburgh, for Daffodils.  
To Mr. J. L. Richardson, Waterford, for Daffodils.

*Bronze Banksian Medal.*

To Mr. J. W. Barr, Wimborne, for Daffodils.

*Award of Merit.*

To *Tulip* 'Helenium' (votes 9 for, 0 against), from Messrs. Sutton, Reading. The flowers are large, double, and of a clear buttercup-yellow.

To *Narcissus* 'White Nile,' for market and cutting purposes (votes 14 for, 0 against), from Mr. J. L. Richardson. A refined giant Leedsii variety, Division IV. (a), with white perianth and pale primrose cup. Raised by The Brodie of Brodie.

To *Narcissus* 'Godrevy,' for show purposes (votes 12 for, 0 against), from Mr. P. D. Williams, St. Keverne. A large Trumpet variety, Division I. (a), golden-yellow in colour, with broad perianth and very wide trumpet frilled and recurved at the mouth. Raised by Mr. P. D. Williams.

To *Narcissus* 'Bodilly,' for show purposes (votes 14 for, 0 against), from Mr. P. D. Williams. A giant Leedsii variety, Division IV. (a), with broad, bluntly pointed white perianth and rather straight yellow-frilled trumpet. Raised by Mr. P. D. Williams.

To *Narcissus* 'Milkmaid,' for show purposes (votes 10 for, 0 against), from Mr. P. D. Williams. A giant Leedsii variety, Division IV. (a), with a broad white perianth and a pale yellow trumpet, which is lighter in colour and frilled at the rim. Raised by Mr. P. D. Williams.

To *Narcissus* 'Dominick,' for show purposes (votes 10 for, 1 against), from Mr. P. D. Williams. A finely proportioned *incomparabilis* variety, Division II. (a). The flower is of good texture and well poised on a stout stem. It is of a deep golden-yellow with a frilled trumpet. Raised by Mr. P. D. Williams.

To *Narcissus* 'Damson,' for show purposes (votes 11 for, 8 against), from Mr. P. D. Williams. An *incomparabilis* variety, Division II. (a), with broad cream perianth segments, slightly tinged with red near the cup, which is cream stained red. Raised by Mr. P. D. Williams.

To *Narcissus* 'St. Winnow,' for show purposes (votes 8 for, 3 against), from Mr. P. D. Williams. A chaste white giant Leedsii variety, Division IV. (a), with perianth segments of good substance and a broad frilled cup. Raised by Mr. P. D. Williams.

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NARCISSUS AND TULIP COMMITTEE, APRIL 7, 1925.

Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and sixteen other members present.

**Awards Recommended :—**

*Gold Medal.*

To Messrs. Barr, Covent Garden, for Daffodils.

*Silver Banksian Medal.*

To Messrs. R. H. Bath, Wisbech, for Daffodils.  
To Messrs. James Carter, Raynes Park, for Tulips.

*The Peter Barr Memorial Cup.*

To Mr. F. H. Chapman, Rye, for his work in connexion with Daffodils.

*Award of Merit.*

To *Narcissus* 'Irene Copeland,' for show purposes (votes 6 for, 0 against), from Mr. W. F. M. Copeland, Southampton. A fine, if not a refined double variety, Division X. The outer large segments are greenish-yellow; those in the centre are paler and have small orange-red ones interspersed among them. The flowers become almost white after a few days in the sunshine. Raised by the sender.

To *Narcissus* 'Pilgrimage,' for show purposes (votes unanimous), from Mr. F. H. Chapman. A well-proportioned *incomparabilis* variety, Division II. (a), of a rich yellow colour with a large orange-tinted cup. Raised by The Brodie of Brodie.

## NARCISSUS AND TULIP COMMITTEE, APRIL 15, 1925.

Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, and twenty-three other members present.

**Awards Recommended :—***Gold Medal and Special Congratulations.*

To Mr. J. L. Richardson, Waterford, for Daffodils.

*Gold Medal.*

To Messrs. Barr, Covent Garden, for Daffodils.

To Messrs. R. H. Bath, Wisbech, for Daffodils.

To the Donard Nursery Co., County Down, for Daffodils.

*Silver-gilt Banksian Medal.*

To the Welsh Bulb Fields, St. Asaph, for Daffodils.

To Messrs. J. R. Pearson, Lowdham, for Daffodils.

*Silver Banksian Medal.*

To Messrs. Cartwright & Goodwin, Kidderminster, for Daffodils.

To Mr. J. W. Barr, Wimborne, for Daffodils.

To Mr. W. F. M. Copeland, Southampton, for Daffodils.

*Bronze Banksian Medal.*

To Mr. W. P. Downes, Wisbech, for Daffodils.

To Mr. E. H. C. Thurston, Chandler's Ford, for Daffodils.

*Award of Merit.*

To *Narcissus* 'Lady Diana Manners,' for garden and market purposes (votes 14 for, 0 against), from Messrs. J. White, Spalding. A bi-colour Barrii variety, Division III. (b), with white, broad, slightly reflexed perianth segments of good substance and a rich orange-scarlet crown. Raised by Mrs. R. O. Backhouse.

To *Narcissus* 'Yellow Jacket,' for show and pot purposes (votes 10 for, 5 against), from Mr. C. A. Jardine, Chiswick. This variety is usually classed with the *Jonquilla* hybrids, Division VII., although it is supposed by some to have *gracilis* and *Poeticus* blood. The small starry flowers have orange-tinted yellow perianth segments and yellow cups. Raised by Mr. P. D. Williams.

To *Narcissus* 'Dawson City,' for show purposes (votes 19 for, 0 against), from Messrs. R. H. Bath. A grand soft golden-yellow Trumpet variety, Division I. (a), with unusually broad perianth segments and a long trumpet with frilled but not recurved rim. Raised by Messrs. van Tubergen.

To *Narcissus* 'Treasure,' for show purposes (votes 19 for, 0 against), from Messrs. R. H. Bath. A very shapely golden-yellow Trumpet variety, Division I. (a), with broad overlapping segments and a wide, rather short trumpet with a recurved frilled rim. Raised by Messrs. van Tubergen.

To *Narcissus* 'Kingcroft,' for market purposes (votes 14 for, 1 against), from Mr. P. D. Williams, St. Keverne. A very meritorious Poetaz variety, Division VIII., with large finely formed substantial flowers. Each stout stem carries two fragrant blooms with white perianths and orange crowns. Raised by Mr. P. D. Williams.

To *Narcissus* 'Jubilant,' for show purposes (votes unanimous), from Mr. P. D. Williams. A splendid large, well-formed, clean-cut, bright sulphur-yellow *incomparabilis* variety, Division II. (a). Raised by Mr. P. D. Williams.

To *Narcissus* 'Beersheba,' for show purposes (votes unanimous), from Mr. J. L. Richardson. An exquisite chaste large white Trumpet variety, Division I. (b), with broad, bluntly pointed perianth segments and a very long slightly frilled trumpet. Raised by Rev. G. H. Engleheart.

*Preliminary Commendation.*

To *Narcissus* 'Fanny Currey,' for show purposes (votes unanimous), from Mr. J. L. Richardson. A giant Leedsii variety, Division IV. (a), with semi-

transparent white perianth and a pink frilled rim to the wide-mouthed cup. Raised by Mr. J. L. Richardson.

To *Narcissus* 'Hades,' for show purposes (votes 17 for, 0 against), from Mr. J. L. Richardson. A beautiful Barrii variety, Division III. (a), with a creamy-yellow perianth with a broad, rounded, deep orange-scarlet cup. Raised by Mrs. R. O. Backhouse.

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#### NARCISSUS AND TULIP COMMITTEE, APRIL 21, 1925.

Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and twelve other members present.

#### Awards Recommended :—

##### *Gold Medal.*

To Messrs. Barr, Covent Garden, for Daffodils.

To Messrs. Sutton, Reading, for Tulips.

##### *Silver-gilt Banksian Medal.*

To Messrs. R. H. Bath, Wisbech, for Daffodils.

##### *Silver Banksian Medal.*

To Mr. J. W. Barr, Wimborne, for Daffodils.

To Mr. W. F. M. Copeland, Southampton, for Daffodils.

##### *Bronze Banksian Medal.*

To the Maytham Gardens, Rolvenden, for Tulips.

##### *First-class Certificate.*

To *Narcissus* 'Mary Copeland,' for show purposes (votes 9 for, 0 against), from Mr. W. F. M. Copeland. A handsome double variety, Division X., the larger segments of which are cream-coloured, while the small ones are deep orange. Raised by Mr. W. F. M. Copeland.

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#### NARCISSUS AND TULIP COMMITTEE, MAY 5, 1925.

Mr. E. A. Bowles, M.A., F.L.S., V.M.H., in the Chair, and sixteen other members present.

#### Awards Recommended :—

##### *Silver-gilt Banksian Medal.*

To Messrs. Barr, Covent Garden, for Daffodils and Tulips.

To Mr. F. H. Chapman, Rye, for Daffodils.

##### *Silver Banksian Medal.*

To Mr. J. W. Barr, Wimborne, for Daffodils.

To Messrs. R. H. Bath, Wisbech, for Daffodils and Tulips.

To Messrs. Dobbie, Edinburgh, for Daffodils.

##### *Cultural Commendation.*

To Messrs. Dobbie, Edinburgh, for an exhibit of *Narcissus* 'Firetail.'

##### *Award of Merit.*

To *Narcissus* 'Mrs. John Robinson,' for show purposes (votes 8 for, 1 against), from Mr. A. Robinson, Bawtry. A well-formed Poeticus variety, Division IX., with broad white perianth segments of good substance and a deep yellow-crimson-edged cup. Raised by Mr. A. Robinson.

To *Narcissus* 'Morocco,' for show purposes (votes 11 for, 0 against), from Mr. F. H. Chapman. A fine bi-colour Barrii variety, Division III. (b), with broad overlapping white perianth segments and a rather wide dark orange cup. Raised by The Brodie of Brodie.

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 21 = " " " M. H. F. Sutton.  
 22 = " " " C. B. Tahourdin.  
 23 = " " " Messrs. Vilmorin-Andrieux et Cie.

*Abbreviations.*—cor. = corrected; il. = illustrations; introd. = introduction;  
 pl. = plates; col. pl. = coloured plates; frontis. = frontispiece; portr. =  
 portrait; enl. = enlarged; coloph. = colophon; pref. = preface; rev. = revised.

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- SCHUMANN, KARL. *Verzeichnis der gegenwärtig in den Kulturen befindlichen Kakteen*. Neudamm, 1897. 8vo. (3)
- SCOTT, C. *The show chrysanthemum and its cultivation*. London, 1897. sm. 8vo. (3)
- SCOTTISH GARDENER, THE. *A magazine of horticulture and floriculture*. New series. Vol. v., nos. 2, 3, 8. Edinburgh, 1856. 8vo. (3)
- SINGER, MAX. *Dictionnaire des roses*. . . . Tournai, 1885. 2 vols. pls. 8vo. (3)
- SLATER, JOHN. *A descriptive catalogue of tulips, together with its history, mode of cultivation, &c.* London, 1843. 1 pl. 12mo. (3)
- SOCIÉTÉ FRANÇAISE DES CHRYSANTHÉMISTES. *Mémoires lus au congrès*. . . . à Orléans. Paris, 1898. 8vo. (3)
- Contains: *Maladies et parasites du chrysanthème*, par M. CHIFFLOT. *De la fécondation dans le chrysanthème*, par M. R. GÉRARD. *Des meilleurs engrais et composts à employer dans la culture des chrysanthèmes*, par M. FATZER.
- *Le chrysanthème et sa culture*. Brochure de propagande. Paris, 1909. il. 12mo. (3)
- SPANGENBERG, E. *Praktische Erdbeerkultur*. . . . Frankfurt a. Oder, 1905. il. 8vo. (3)
- 3te. . . . Auflage. Frankfurt a.d. Oder, 1918. il. 8vo. (3)
- STRAWSON, G. F. *Standard fungicides and insecticides in agriculture*. Part 1. London, 1903. 8vo. (20)
- SUTTON, M. H. F. [editor]. *The book of the links. A symposium on golf*. By Sir GEORGE RIDDELL, B. DARWIN, M. H. F. SUTTON, H. S. COLT, A. D. HALL. Prize essay by a green-keeper. Supplementary notes on manures, tables and miscellaneous information. London, 1912. pref. il. 8vo. (21)
- SWEET, ROBERT. *The botanical cultivator*. . . . London, 1821. 8vo. (3)
- S[WITZER], S. *A compendious . . . method . . . for the raising Italian brocoli, Spanish cardoon, celeriac, fenochi, and other foreign kitchen vegetables . . . as also a more authentick account of the la lucerne, St. Foyne, clover, and other grass seeds*. . . . London, n.d. 8vo. (3)
- SYDENHAM, WILLIAM. *Violas and roses*. Tamworth, 1899. 8vo. (3)
- TAHOUDIN, C. B. *Native orchids of Britain*. . . . Croydon, 1925. pref. il. 8vo. (22)
- TAUBENHAUS, J. J. *The diseases of the sweet pea*. (Delaware Agr. Exp. St. Bull. 106.) Newark, Delaware, 1914. il. 8vo. (3)
- THIBAULT, —. *Culture des pelargonium*. Paris, n.d. 12mo. (3)
- THIBAULT, EMILE. *Note sur la culture anglaise des chrysanthèmes*. . . . Nantes, 1892. il. 8vo. (3)
- THIÉBAUT DE BERNEAUD, ARSENNE. *Mémoire sur les dahlias*. . . . 2me éd. Paris, 1834. 8vo. (3)
- THIELE, F. H. A. *Wie erzieht man Levkoien-Saamen, der gefüllte Stöcke in Menge giebt*. . . . Cöslin, 1825. 8vo. (3)
- THOMAS, Dr. J. H. *Chrysanthemums, a practical treatise on their propagation, cultivation, training, raising for market, exclusively out of doors in the garden or field*. Wyoming, Del., [1909]. 12mo. (3)
- THOMAS, K. *Die Treiberei der Hyacinthen*. Leipzig, n.d. 8vo. (3)
- THOMPSON, WILLIAM. *Garden inscriptions*. Oxford, 1760. 8vo. (3)
- THOMSON, DAVID. *A practical treatise on the culture of the pine-apple*. Edinburgh and London, 1866. 8vo. (3)
- TOULOUSE. *Société d'Horticulture de la Haute-Garonne. Annales*. Vols. 35-36. Toulouse, 1888-89. 8vo. (3)
- TRUFFAUT, GEORGES. *Étude sur la culture et la végétation des chrysanthèmes*. (Journ. Soc. Nat. Hort. Fr.) [Paris], 1896. 8vo. (3)
- Commission des engrais but de ses travaux. (Journ. Soc. Nat. Hort. Fr.) Paris, 1901. 8vo. (3)
- TURIN. *Exposition internationale d'Horticulture, 1904*. [Programme] Turin, 1903. pref. 8vo. (3)
- TURNBULL, J. *Fruit growing, do's and don'ts*. London, 1925. il. 8vo. (1)
- [TYAS, R.] *Popular flowers: their cultivation, propagation, and general treatment in all seasons*. London, 1844. col. pls. 8vo. (3)
- Second series. London, 1844. col. pls. 8vo.

- TYSE & SON. The ranunculus, how to grow it. . . London, 1847. 12mo. (3)
- UDALE, J. Chrysanthemums: their history and culture. Droitwich, n.d. [1893.] 8vo. (3)
- VALETTE, P., aîné. Notice sur la culture des chrysanthèmes. Lyon, n.d. [1886.] 12mo. (3)
- VAUPEL, FRIEDRICH. Die Kakteen. Monographie der *Cactaceae*. Lief. 1. Berlin, 1925. il. 8vo. (3)
- VIBERT, J. P. Observations sur la nomenclature et le classement des roses, suivies du catalogue de celles cultivées. Paris, 1820. 8vo. (3)
- VILMORIN, HENRI DE. Compte rendu de l'exposition de chrysanthèmes tenue à Roubaix, du 17 au 25 Novembre, 1888. (Journ. Soc. Nat. Hort. Fr.) [Paris], 1889. 8vo. (3)
- Le chrysanthème, histoire, physiologie et culture en France et à l'étranger. Paris, 1896. il. 8vo. (3)
- VILMORIN-ANDRIEUX & CIE. Les plantes potagères, description et culture des principaux légumes des climats tempérés. 4me éd. Paris, 1925. il. 8vo. (23)
- VIVIAND-MOREL, V. Instructions sur la culture des chrysanthèmes à la grande fleur. 2me éd. Paris, n.d. 12mo. (3)
- La culture des chrysanthèmes à la grande fleur. 3e éd. Lyon-Villeurbanne, n.d. il. 8vo. (3)
- VOORHELM, GEORGE. Traité sur la jacinte. . . 2de éd. Harlem, 1762. portr. 8vo. (3)
- WAKEFIELD, PRISCILLA. An introduction to botany, in a series of familiar letters. 6th ed. London, 1812. col. pls. 8vo. (3)
- WALDSTEIN, F. A. VON, and KITABEL, P. Descriptiones et icones plantarum rariorum Hungariae. Viennae, 1802-12. 3 vols. 280 col. pls. fol. (3)
- WARD, H. W. Flowers and flower culture. London, n.d. sm. 8vo. (3)
- WEATHERS, J. My garden book. . . London, 1924. il. col. pls. 8vo. (1)
- WELLS, W. Book on the culture of the chrysanthemum. Earlswood, Surrey, n.d. [1896.] il. 8vo. (3)
- WESTER, P. J. Plant propagation and fruit culture in the tropics. Manila, 1920. il. pls. 8vo. (3)
- WESTON, RICHARD. The gardener's pocket calendar. . . 4th ed. London, 1789. sm. 8vo. (3)
- WHEELER, JAMES. The botanist's and gardener's new dictionary. . . London, 1763. 8vo. (3)
- WHITING, J. B. Manual of flower gardening for ladies. . . London, 1849. il. sm. 8vo. (3)
- WILMORE, W. W. Dahlias, peonies, gladioli, hardy plants. Denver, Colorado, 1907. il. 8vo. (3)
- The dahlia manual. A treatise on dahlia culture. Denver, Colorado, 1907. il. 8vo. (3)
- WILSON, E. H. America's greatest garden. The Arnold Arboretum. Boston, Mass., 1925. pls. 8vo. (3)
- The lilies of eastern Asia. A monograph. London, 1925. pls. la. 8vo. (1)
- WITTROCK, VEIT BRECHER. Viola-studier, I tafelr. (Act. Hort. Berg. ii. n. 1.) [Stockholm], n.d. 12 col. pls. la. 8vo. (3)
- II. (L.c. ii. no. 7.) Stockholm, 1895. il. la. 8vo. (3)
- WOOD, EDMUND M. The chrysanthemum, its past, present, and future. Boston, 1898. 8vo. (3)
- WRIGHT, JOHN. Culture of the chrysanthemum, with select list of large flowering, Japanese, and pompon varieties. 1st ed. London, 1883. pref. sm. 8vo. (3)
- 2nd ed. London, 1884. 8vo. (3)
- Descriptive catalogue of chrysanthemums . . . 1885-6. London, 1885. 8vo. (3)
- Profitable fruit-growing for cottagers and small holders of land. London, 1889. il. 8vo. (3)
- WRIGHT, W. P. The sweet pea notebook, 1911-12-13-14. Folkestone and Canterbury, 1911-14. 4 pts. 12mo. (3)
- WROB, J. B. Chrysanthemums and how to grow them for exhibition. . . London, n.d. [1903.] il. 8vo. (3)
- YOKOHAMA NURSERY CO. Lilies of Japan. Yokohama, 1907. col. il. la. 8vo. (3)
- YUNG, PAUL. Une visite au berceau des chrysanthèmes. (Bull. Soc. Hort. Meaux, no. 2.) Meaux, 1899. 8vo. (3)
- ZVOLANEK, ANT. C. Culture and history of winter flowering sweet peas. Bound Brook, N.J., n.d. [1907.] il. 8vo. (3)



# EXTRACTS FROM THE PROCEEDINGS

## OF THE

### ROYAL HORTICULTURAL SOCIETY.

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#### GENERAL MEETING.

JULY 14, 1925.

Sir WILLIAM LAWRENCE, Bt., in the Chair.

One hundred and forty-one Fellows were elected.  
*The Clay Challenge Cup*, for a new Rose bearing the true Old Rose scent, was awarded to Messrs. A. Dickson, Hawlmark, Belfast, for 'Lady Ellen Magloona.'

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#### GENERAL MEETING.

JULY 28, 1925.

Mr. SAMUEL POPE in the Chair.

Sixty Fellows and one Associate were elected, and two Societies affiliated.  
A lecture on "Sweet Peas" was given by Mr. Andrew Ireland.

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#### GENERAL MEETING.

AUGUST 11, 1925.

The Rt. Hon. The Lord LAMBOURNE, P.C., V.M.H., in the Chair.

Thirty-seven Fellows were elected.

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#### GENERAL MEETING.

AUGUST 25, 1925.

Mr. G. W. LEAK in the Chair.

Thirty-nine Fellows were elected, and one Society affiliated.

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#### GLADIOLUS SOCIETY'S SHOW.

##### *Awards.*

*The Foremarke Cup*, for twenty spikes of named Gladioli in not less than ten varieties, was awarded to Messrs. G. Mair, Prestwick.

Class 15.—For large-flowered new varieties of Gladioli.

*Silver Flora Medal.*

To Messrs. G. Mair, Prestwick.

VOL. LI.

Class 16.—For new *Primulinus* varieties of *Gladioli*.

*Silver Flora Medal.*

To Mr. A. J. Bliss, Tavistock.

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DEPUTATION TO SOUTHPORT SHOW.

AUGUST 26, 1925.

A deputation of the Council of the Society visited Southport on August 26, 1925, and made awards as shown below. The deputation consisted of Messrs. W. A. Bilney, V.M.H., W. Cuthbertson, V.M.H., and W. R. Dykes, M.A., L. ès L.

*Gold Medal.*

To Mr. W. J. Unwin, Histon, Cambridge, for *Gladioli*.

To the Hon. Vicary Gibbs, Aldenham House, Elstree, for Vegetables.

To Messrs. Alex. Dickson, Hawlmark, Belfast, for Roses and Sweet Peas.

To Mr. H. Woolman, Sandy Hill Nurseries, Shirley, Birmingham, for Dahlias.

To Messrs. James Cypher, Cheltenham, for a decorative group of flowering and foliage plants.

To Messrs. M. Prichard, Christchurch, for herbaceous plants.

To Messrs. S. McGredy, Portadown, for Roses.

*Silver-gilt Flora Medal.*

To Messrs. Sutton, for a group of flowering plants.

To Messrs. Bees, Sealand Nurseries, Chester, for Roses.

To Messrs. McBean, Cooksbridge, for Orchids.

To Mr. C. Engelmann, Saffron Walden, for Carnations.

To Mr. H. J. Jones, Lewisham, for Phlox and *Gladioli*.

To Messrs. Dobbie, Edinburgh, for Dahlias, Roses, etc.

To Messrs. Blackmore & Langdon, Bath, for Delphiniums and Begonias.

*Silver Flora Medal.*

To Messrs. Isaac House, Westbury-on-Trym, for Scabious.

To Messrs. James Vert, Saffron Walden, for Hollyhocks.

To Messrs. Herd, Market Square, Penrith, for Sweet Peas.

To Messrs. John Forbes, Hawick, for Phlox and Pentstemons.

To Messrs. James Carter, for florists' flowers.

To Messrs. Wilson & Agar, Linton Nurseries, Twyford, Berks, for *Gladioli*.

To Messrs. W. H. Simpson, Birmingham, for Antirrhinums.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. Dickson & Robinson, Manchester, for *Gladioli*, Chrysanthemums, etc.

*Silver-gilt Hogg Medal.*

To Messrs. G. Bunyard, Maidstone, for fruit.

To Messrs. T. Rivers, Sawbridgeworth, for fruit trees in pots.

*Silver Hogg Medal.*

To Mr. S. Gordon, Monreith Gardens, Whauphill, Wigtownshire, for twelve bunches of Grapes.

*Silver Knightian Medal.*

To Messrs. Dobbie, Edinburgh, for Potatoes.

To Messrs. Edward Webb, Stourbridge, for vegetables.

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GENERAL MEETING.

SEPTEMBER 8, 1925.

Mr. H. B. MAY in the Chair.

Twenty-four Fellows and one Associate were elected, and two Societies affiliated.

A lecture was given by Mr. George Monro on "How Covent Garden helps both Producer and Consumer."

## R.H.S. VEGETABLE SHOW.

SEPTEMBER 8, 1925.

## LIST OF JUDGES.

DICKS, S. B.	PRITCHARD, W.
DIVERS, W. H., V.M.H.	SMITH, A. C.
ELLWOOD, G.	VINE, J. E.
LOBJOIT, W. G.	WILKINS, H. T.

*Chief Awards.*

Class 1.—Amateurs. Collection of Vegetables.

*First Prize, Sutton Cup.*

To Mrs. Jenner, Wenvoe Castle, Cardiff (gr. Mr. H. Wheeler).

*R.H.S. Challenge Cup, for highest number of points gained at the Show.*

To R. Chetwynd-Stapylton, Esq., Headlands, Berkhamsted (gr. Mr. W. Meager), 14 points.

## DEPUTATION TO EDINBURGH.

SEPTEMBER 9, 1925.

A deputation of the Council of the Society visited Edinburgh on September 9, 1925, and made awards as shown below. The deputation consisted of Sir William Lawrence, Bt., Messrs. E. A. Bunyard, F.L.S., W. Cuthbertson, V.M.H., and W. R. Dykes, M.A., L. ès L.

*Awards.**Gold Medal and Congratulations of the Council.*

To Corporation of Edinburgh for a formal garden.  
To Messrs. Sutton, Reading, for vegetables.

*Gold Medal.*

To Messrs. Austin & McAslan, Glasgow, for a group of flowers and vegetables.  
To Messrs. Dobbie, Edinburgh, for Dahlias, Roses, etc.

*Silver-gilt Flora Medal.*

To Backhouse Nurseries, York, for a rock garden.  
To Messrs. Bakers, Codsall, near Wolverhampton, for hardy flowers.  
To Messrs. Dickson, Edinburgh, for Roses.  
To Messrs. Forbes, Buccleuch Nurseries, Hawick, for Pentstemons and herbaceous flowers.  
To Mr. Maxwell M. Hart, Glasgow, for a rock garden.  
To Messrs. Laird & Dickson, Pinkhill Nurseries, Murrayfield, Edinburgh, for rock garden and rock plants.  
To Messrs. S. McGredy, Royal Nursery, Portadown, for Roses.  
To Mr. Thomas Robinson, Porchester Nurseries, Nottingham, for Roses.  
To Messrs. Thynne, Dundee, for hardy flowers.

*Silver-gilt Knightian Medal.*

To Messrs. James Carter, Raynes Park, for vegetables.  
To Messrs. Tillie & Whyte, Edinburgh, for vegetables.

*Silver-gilt Hogg Medal.*

To Mr. R. C. Notcutt, The Nursery, Woodbridge, Suffolk, for fruit.  
To Messrs. Storrie & Storrie, Carse of Gowrie Nurseries, Glencarse, for fruit trees in pots.  
To the Earl of Strathmore, Glamis Castle (gr. Mr. D. McInnes), for Grapes.

*Silver Flora Medal.*

- To Messrs. Blackmore & Langdon, Bath, for Begonias.  
 To Mr. John Downie, Edinburgh, for hardy flowers.  
 To Messrs. E. F. Fairbairn, Edentown Nurseries, Carlisle, for Phloxes and Dahlias.  
 To Messrs. I. House, Westbury-on-Trym, for Scabious.  
 To Messrs. Lowe & Gibson, Crawley Down, Sussex, for Gladioli.  
 To Messrs. Rich, Bath, for herbaceous flowers.  
 To Messrs. Cunningham Fraser, Comely Bank Nurseries, Edinburgh, for hardy flowers.  
 To Messrs. L. R. Russell, Richmond, for Clematis.  
 To Mr. T. Smith, Daisy Hill Nursery, Newry, Co. Down, for hardy plants.  
 To Mr. W. Wells, jun., Hardy Plant Nurseries, Merstham, Surrey, for herbaceous flowers.  
 To Sir Basil Montgomery, Kinross House, Kinross (gr. Mr. R. Fraser), for herbaceous flowers.  
 To Lord Cochrane, Cults, Ladybank, Fife (gr. Mr. J. Smith), for Sweet Peas.

*Silver Hogg Medal.*

- To Carse of Gowrie Nursery Co., Waterbutts, Errol, for fruit.  
 To Messrs. Daniels, Royal Norfolk Seed Establishment, Norwich, for fruit and vegetables.  
 To Earl Balfour, Whittinghame, Prestonkirk (gr. Mr. G. F. Anderson), for a collection of Apples.

*Silver Lindley Medal.*

- To Carse of Gowrie Nursery Co., Waterbutts, Errol, for old Scottish varieties of Apples and Pears.  
 To Messrs. G. Mair, Prestwick, Ayrshire, for finely grown Gladioli.

*Silver Knightian Medal.*

- To Mr. John Gray, Middlewood, Uddington, for a collection of vegetables.

*Bronze Lindley Medal.*

- To Mr. R. Whitlaw, Laurencekirk, for well-grown Gladioli.

*Bronze Knightian Medal.*

- To Mr. Thomas Johnston, Helensburgh, for a collection of vegetables.

*Veitch Memorial Medal in Silver and £5.*

- To Viscountess Cowdray, Dunecht (gr. Mr. W. Smith), for a group of stove and greenhouse plants.

*Veitch Memorial Medal in Bronze and £2 10s.*

- To Earl Balfour, Whittinghame, Prestonkirk (gr. Mr. G. F. Anderson), for dessert fruit.

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HOLLAND PARK SHOW.

SEPTEMBER 22-24, 1925.

LIST OF JUDGES.

ALEXANDER, H. G.	FIFE, R.
BALFOUR, F. R. S.	FITT, J. E.
BEAN, W. J., V.M.H.	GIBBS, Hon. VICARY, V.M.H.
BECKETT, C.	HANBURY, F. J., V.M.H.
BECKETT, E., V.M.H.	HOSKING, A.
BEDFORD, A.	MACLAREN, B. H.
BUSS, F.	METCALFE, A. W.
CAMPBELL, D.	MORTER, W. H.
CARPENTER, G.	PAGE, COURTNEY.
COBB, A. J.	PAGE, W. H.
CORY, R.	SMITH, W. T.
COUTTS, J.	STEVENSON, T.
DARLINGTON, H. R.	VINE, J. E.
DIVERS, W. H., V.M.H.	WALLACE, W. E.
FIELDER, C. R., V.M.H.	WILSON, G.

*List of Awards.*

## CHALLENGE CUPS.

*Coronation Cup for the most meritorious group.*

To Messrs. Dobbie, Edinburgh.

*Wigan Cup for the best exhibit of Roses.*

To Mr. Elisha J. Hicks, Hurst, Twyford, Berks.

## FRUIT AND VEGETABLES.

*Gold Medal.*

To Barnham Nurseries, Sussex, for fruit.

*Silver Hogg Medal.*

To Studley College, Warwick, for fruit.

*Bronze Hogg Medal.*

To Messrs. Stuart Low, Bush Hill Park, for fruit.

## ROSES.

*Gold Medal.*

To Mr. Elisha J. Hicks, Hurst, Twyford, Berks, for Roses.

To Mr. George Prince, Longworth, Oxford, for Roses.

*Silver Cup.*

To Messrs. Chaplin, Waltham Cross, for Roses.

To Messrs. Alex. Dickson, Newtownards, for Roses.

To Messrs. S. McGredy, Portadown, for Roses.

*Silver-gilt Flora Medal.*

To Messrs. D. Prior, Colchester, for Roses.

To Mr. T. Robinson, Nottingham, for Roses.

*Silver-gilt Banksian Medal.*

To Mr. J. H. Pemberton, Havering-atte-Bower, for Roses.

To Messrs. J. Waterer, Sons &amp; Crisp, Twyford, for Roses.

*Silver Flora Medal.*

To Messrs. A. J. Allen, Norwich, for Roses.

To Messrs. B. R. Cant, Colchester, for Roses.

To Messrs. Frank Cant, Colchester, for Roses.

To Mr. T. P. Edwards, Southgate, for Roses.

To Messrs. A. Warner, Colchester, for Roses.

*Silver Banksian Medal.*

To Mr. J. Mattock, Headington, for Roses.

## ORCHIDS.

*Silver-gilt Flora Medal.*

To Messrs. Stuart Low, Bush Hill Park, for Orchids.

*Silver Flora Medal.*

To Messrs. Flory &amp; Black, Slough, for Orchids.

To Messrs. Cowan, Southgate, for Orchids.

## SHRUBS.

*Silver Cup.*

To Messrs. Hillier, Winchester, for conifers and shrubs.

*Silver-gilt Flora Medal.*

To Messrs. J. Cheal, Crawley, for shrubs.

*Silver-gilt Banksian Medal.*

To Mr. G. Reuthe, Keston, for shrubs and Rhododendrons.  
To Messrs. R. Wallace, Tunbridge Wells, for shrubs.

*Silver Flora Medal.*

To Messrs. A. Charlton, Rotherfield, for ornamental trees and shrubs.  
To Messrs. R. C. Notcutt, Woodbridge, for shrubs.

*Silver Banksian Medal.*

To Messrs. R. & G. Cuthbert, Southgate, for conifers.  
To Messrs. Fletcher Bros., Ottershaw, for conifers and berried plants.  
To Messrs. Robert Green, London, for Bay trees.  
To Messrs. Harrods, London, for Bay and Box trees.

*Bronze Flora Medal.*

To Hollamby's Nurseries, Groombridge, for berried plants.  
To Mr. J. Klinkert, Richmond, for clipped Yew and Box trees.  
To Orpington Nurseries Co., Orpington, for shrubs.

DAHLIAS.

*Gold Medal.*

To Messrs. Dobbie, Edinburgh, for Dahlias.

*Silver Cup.*

To Messrs. Dickson & Robinson, Manchester, for Dahlias.

*Silver-gilt Flora Medal.*

To Messrs. Jarman, Chard, for Dahlias.  
To Mr. H. J. Jones, Lewisham, for Dahlias.  
To Mr. J. B. Riding, Chingford, for Dahlias.  
To Messrs. J. Stredwick, St. Leonards, for Dahlias.  
To Messrs. W. Treseder, Cardiff, for Dahlias.  
To Mr. J. T. West, Brentwood, for Dahlias.

*Silver-gilt Banksian Medal.*

To Messrs. J. Cheal, Crawley, for Dahlias.  
To Mr. C. Turner, Slough, for Dahlias.

*Silver Flora Medal.*

To Messrs. Carter Page, London, for Dahlias.

*Silver Banksian Medal.*

To Mr. H. Hemsley, Crawley, for Dahlias.  
To Messrs. D. Prior, Colchester, for Dahlias.

CARNATIONS, ETC.

*Silver Cup.*

To Messrs. Allwood Bros., Haywards Heath, for Carnations.

*Silver-gilt Flora Medal.*

To Messrs. C. Engelmann, Saffron Walden, for Carnations.  
To Messrs. Stuart Low, Bush Hill Park, for Carnations.  
To Mr. James MacDonald, Harpenden, for grass garden.

*Silver Flora Medal.*

To Mr. Amos Perry, Enfield, for hardy Ferns.

MIXED GROUPS.

*Silver Cup.*

To Messrs. Blackmore & Langdon, Bath, for Begonias.  
To A. P. Brandt, Esq., Betchingley, for Lilies, Palms, and Crotons.  
To Messrs. J. Peed, London, for greenhouse plants.  
To Messrs. Sutton, Reading, for Gloxinias.

*Silver-gilt Flora Medal.*

- To Messrs. Austin & McAslan, Glasgow, for Gladioli.
- To Messrs. R. H. Bath, Wisbech, for Gladioli.
- To Messrs. James Carter, Raynes Park, for Lilies, Grass, etc.
- To Mr. H. J. Jones, Lewisham, for Michaelmas Daisies.
- To Mr. J. W. Forsyth, Luton, for Chrysanthemums.
- To Messrs. W. Cutbush, Barnet, for herbaceous plants.
- To Mr. W. Wells, jun., Merstham, for herbaceous plants.
- To Messrs. Wilson & Agar, Twyford, for herbaceous plants.
- To Messrs. B. Ladhams, Southampton, for hardy plants and Lobelias.
- To Messrs. G. Jackman, Woking, for herbaceous plants.

*Silver-gilt Banksian Medal.*

- To Orpington Nurseries Co., Orpington, for Gladioli.
- To Mr. E. Ballard, Colwall, for Michaelmas Daisies.
- To Mr. Amos Perry, Enfield, for herbaceous plants.
- To Messrs. J. Cheal, Crawley, for herbaceous plants.
- To Chalk Hill Nurseries, Reading, for herbaceous plants and Poppies.
- To Messrs. L. R. Russell, Richmond, for Clematis.

*Silver-gilt Lindley Medal.*

- To Mr. F. Frith, Wembley, on behalf of South African Railways, for succulents.

*Silver Flora Medal.*

- To Mr. R. J. Case, Taunton, for Pelargoniums.
- To Mr. W. Yandell, Maidenhead, for Chrysanthemums and Violas.
- To Messrs. K. Luxford, Harlow, for Chrysanthemums.
- To Mr. S. Smith, Enfield, for Cacti and succulents.
- To Messrs. M. Prichard, Christchurch, for herbaceous and alpinas.
- To Mr. F. G. Wood, Ashted, for herbaceous and alpinas.
- To Mr. G. Jones, Letchworth, for alpinas.
- To Messrs. Isaac House, Westbury-on-Trym, for Scabious and Kniphofias.
- To Messrs. Harkness, Bedale, for herbaceous.
- To Messrs. John Forbes, Hawick, for Phloxes and Pentstemons.
- To Messrs. G. Jackman, Woking, for Clematis.

*Silver Banksian Medal.*

- To Messrs. Lowe & Gibson, Crawley Down, for Gladioli.
- To Messrs. Maxwell & Beale, Broadstone, for alpinas and hardy heathers.
- To Mr. T. Bones, Cheshunt, for herbaceous.
- To Messrs. G. Gibson, Bedale, for herbaceous and alpinas.
- To Messrs. C. Elliott, Stevenage, for alpinas and dwarf shrubs.
- To Messrs. Bakers, Codsall, for herbaceous.
- To Messrs. W. H. Rogers, Southampton, for alpinas and perennials.
- To Mr. H. Marcham, Borough Green, for herbaceous.
- To Messrs. F. Fairbairn, Carlisle, for Phloxes and other herbaceous.

*Bronze Flora Medal.*

- To Messrs. Bowell & Skarratt, Cheltenham, for herbaceous plants and alpinas.
- To Central Garden Supplies, Harrow, for alpinas and herbaceous plants.
- To Mr. T. Carlisle, Twyford, for Delphiniums.
- To Mr. G. A. Miller, Wisbech, for hardy plants.

*Bronze Banksian Medal.*

- To Mr. A. Edwards, Fordham, for Gladioli.
- To Messrs. W. H. Simpson, Birmingham, for Antirrhinums and Asters.
- To Mr. G. G. Whitelegg, Chislehurst, for herbaceous.
- To Maytham Gardens, Rolvenden, for herbaceous.

## GENERAL MEETING.

SEPTEMBER 29, 1925.

The Right Hon. The Lord LAMBOURNE, P.C., V.M.H., in the Chair  
Fifteen Fellows and one Associate were elected.

R.H.S. FRUIT SHOW.

SEPTEMBER 29, 1925.

LIST OF JUDGES.

ALLGROVE, J. C.	MESSENGER, W.
BARNES, N. F., V.M.H.	NEAL, E.
BROWN, J.	PATEMAN, T.
BUSS, F.	PEARSON, A. H., V.M.H.
CHEAL, J., V.M.H.	PRINCE, H. A.
DIVERS, W. H., V.M.H.	QUINN, J. G.
DURHAM, Dr.	RAINES, A. W.
EARL, W. J.	RIVERS, H. S.
GOODACRE, L. P.	SMITH, A. C.
HARRIS, E.	SMITH, C. S.
HOWE, W.	VEITCH, P. C. M., V.M.H.
LAXTON, E.	VINE, J. E.
LLOYD, H.	WESTON, J.
MARKHAM, N.	WILSON, J.
METCALFE, A. W.	WOODWARD, G.

*Chief Awards.*

*Gordon-Lennox Cup, for the most meritorious display of Fruit by an Amateur.*

To Capt. M. Drummond (gr. Mr. L. Smith), Southampton.

*George Monro Memorial Cup, for the best exhibit of Grapes by an Amateur.*

To G. Mayer, Esq. (gr. Mr. W. Sayer), Woldingham.

*Affiliated Societies Challenge Cup, for Apples and Pears.*

To the North Walsham and District Horticultural Society.

Class 11.—Amateurs. Collection of ripe dessert fruits.

*First Prize, Silver Hogg Medal and £6.*

To Capt. M. Drummond (gr. Mr. L. Smith), Southampton.

Class 14.—Trade. Collection of hardy fruits.

*Gold Medal and congratulations.*

To Messrs. G. Bunyard, Maidstone.

*Gold Medal.*

To Mr. J. C. Allgrove, Slough.

Class 16.—Market Growers. Twelve British standard boxes of Apples.

*Silver-gilt Hogg Medal.*

To the Hollesley Bay Labour Colony.

*Silver Hogg Medal.*

To Lt.-Col. H. Lumley Webb, Sittingbourne.

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GENERAL MEETING.

OCTOBER 6, 1925.

Sir WILLIAM LAWRENCE, Bt., in the Chair.

One hundred and sixty-four Fellows and three Associates were elected, and four Societies affiliated.

A lecture was given by Mr. E. Beckett, V.M.H., on "Vegetables not commonly grown in our Gardens."



GENERAL MEETING.

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GENERAL MEETING.

OCTOBER 20, 1925.

The Rt. Hon. The Lord LAMBOURNE in the Chair.

Eighty-four Fellows were elected, and two Societies affiliated.

ORCHID SHOW.

*The Orchid Challenge Cup, for the best exhibit of Orchids by an Amateur.*

Awarded to H. T. Pitt, Esq. (gr. Mr. H. Thurgood), London.

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IMPERIAL FRUIT SHOW.

OCTOBER 30—NOVEMBER 7, 1925.

Awards made by the Council at the Imperial Fruit Show, held at the Holland Park Hall.

*Gold Medal.*

Class 1.—To the University College, Reading.

Class 2.—To Mr. S. W. Mount, Canterbury.

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GENERAL MEETING.

NOVEMBER 3, 1925.

Mr. T. HAY, V.M.H., in the Chair.

Sixty-nine Fellows were elected, and two Societies affiliated.

A lecture on "Autumn-flowering Chrysanthemums" was given by Mr. D. B. Crane.

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FRENCH CHRYSANTHEMUM SOCIETY.

NOVEMBER 5, 1925.

Awards made by the Council at the French Chrysanthemum Society's Show, held at Lyons.

*Gold Medal.*

To Monsieur Morin of La Rochelle.

*Silver-gilt Flora Medal.*

To Monsieur Galinier of Béziers.

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GENERAL MEETING.

NOVEMBER 17, 1925.

The Rt. Hon. The Lord LAMBOURNE in the Chair.

Forty-one Fellows and one Associate were elected, and three Societies affiliated.

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GENERAL MEETING.

DECEMBER 1, 1925.

The Rt. Hon. The Lord LAMBOURNE in the Chair.

Sixty-four Fellows and fourteen Associates were elected, and two Societies affiliated.

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GENERAL MEETING.

DECEMBER 15, 1925.

Sir WILLIAM LAWRENCE, Bt., in the Chair.

Sixty-eight Fellows and one Associate were elected, and six Societies affiliated.

# SCIENTIFIC COMMITTEE.

JULY 14, 1925.

Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, and eight other members present.

*British thistles*.—Mr. Fraser showed *Cnicus eriophorus* var. *britannicus* (which occurs in 48 British counties), *C. tuberosus* (in 5 British counties), and the hybrid *C. acaulis* × *C. tuberosus*.

*Coloration of trees*.—Mr. Odell said that he had noticed many trees in the Newmarket and Cambridge districts, the hawthorns in particular, almost golden colour, and the same was noticeable in the nettles.

*Caesalpinia Gilliesii*.—Mr. Hanbury showed a flowering shoot of *Caesalpinia Gilliesii*, and it was remarked that this plant is exceedingly difficult to raise from cuttings, but comes readily from seed.

*Preservation of foliage*.—Mr. Waltham sent a shoot of a lime tree with an inflorescence which he had treated on June 1 and which still preserved its form and colour, although it had been exposed to the air and light in the Laboratory at Wisley for a great part of that time.

## SCIENTIFIC COMMITTEE, JULY 28, 1925.

Sir DAVID PRAIN, F.R.S., V.M.H., in the Chair, eight other members and Mr. VAN DE WEYER (visitor) present.

*Mentha* sp.—Mr. Fraser showed a mint which he had collected at Mortlake—a form of *M. aquatica* with the scent of *M. citrata*. He considered it *M. aquatica minor*, but Briquet called it *M. aquatica capitata*.

He also showed *Allium roseum* from Sutton Montis, a plant naturalized on St. Vincent's Rocks.

*Various plants*.—Mr. Jones showed *Centaurea nigra decipiens* with a white form with broader leaves, and a variety with long rays and one with the outer florets white and the inner coloured. He also showed a white and a pink form of *Centaurea Scabiosa*, *Hypericum undulatum*, *Silene Armeria*, and *Pentstemon Scouleri*.

Mr. Hay showed *Gilia californica*, a woody *Gilia* from California, *Oenothera trichocalyx*, *Omphalodes Luciliae* in its white form, and *Lilium philippinense formosanum*.

A flowering spike of bamboo was sent which proved to be *Arundinaria japonica*.

*Grass from Spain*.—Mr. Van de Weyer showed a grass grown from seed collected by him in Spain which proved to be *Lamarckia aurea*.

## SCIENTIFIC COMMITTEE, AUGUST 11, 1925.

Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, four other members and Mr. C. SCRASE DICKENS (visitor) present.

*Age of Aspidistra leaves*.—Mr. Fraser showed a dead leaf of *Aspidistra* from a plant in his possession, and said that he had marked it as a fresh leaf nine years ago; another he had marked in 1915 lived until 1924, but the non-green portion died before the green.

*Hippophaë rhamnoides*.—He also showed seedlings of *Hippophaë rhamnoides*, and a specimen from its wild habitat on the coast of Lincolnshire, where it produced its berries very freely.

*Branched inflorescence of Buddleia variabilis*.—Mr. Scrase Dickens showed a much branched inflorescence typical of those produced by a seedling of *B. variabilis* in his garden. No member of the Committee had seen such an inflorescence

before, and it seems in the nature of a mutation which may lead to the production of a new race.

*Various plants.*—A specimen of *Taxodium distichum* was sent for naming from the South of France, and a flowering spray of *Stewartia pentagyna* from Col. Trevor Williams' garden at Dromenagh, Iver Heath.

#### SCIENTIFIC COMMITTEE, AUGUST 25, 1925.

Mr. J. W. ODELL, F.L.S., in the Chair, and six other members present.

*Aberrant Helenium.*—Mr. J. W. Odell showed several examples of *Helenium autumnale* with proliferous and virescent flowers and capitula. Several different forms of growth had developed from the capitula. The original plant showing these malformations had been divided and pieces planted in different places. Each had shown the malformations, and so proved that they were not dependent upon soil or other surrounding conditions.

*Chlorotic vegetation.*—Mr. Odell also referred to the frequent occurrence of chlorosis in trees in the Newmarket district this year. The condition appears frequently upon chalky soils, and is apparently due to unavailability of iron and can be reduced by the application of iron sulphate to the soil. Prof. Armstrong considered that it was a symptom of maturity and likely to develop upon some soils, e.g. chalk, under certain weather conditions much more rapidly than upon others.

*Permeation of plant membranes by acids, etc.*—Prof. Armstrong showed whole petals and parts of petals immersed in very weak ammonia to illustrate the fact that liquids do not make their way into leaves through stomata, but as a rule only through cell walls that have been damaged. A cut piece of leaf of *Aucuba* shows a clearly defined black mark where the ammonia has penetrated, and the penetration is regular, and not along the vascular cords. He also referred to the differences in power of penetration exhibited by different acids, and especially to the fact that boracic acid does not penetrate plant membranes, while salicylic acid and benzoic acid do.

*Enations from stem of Coreopsis tinctoria.*—Mr. Staley sent a very curious plant of *Coreopsis tinctoria* with numerous outgrowths from the internodes, some of them being apparently minute flower buds properly formed; many other buds of vegetative form.

#### SCIENTIFIC COMMITTEE, SEPTEMBER 8, 1925.

Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, and six other members present.

*Pigments in flowers.*—Prof. Armstrong made further remarks on the pigments in plants, and demonstrated that in the flowers of Dahlias these fall into two well-marked types, the reds being due to acid salts and the blues to those of potassium.

*Bulbous plant in flower from Uganda.*—Mr. D. H. Reed sent a bulbous plant in flower for name which he received two years ago from Uganda (possibly an *Albuca*). Mr. Cotton took this for identification.

A fungus which had appeared in a garden for several years was also taken by Mr. Cotton for identification and report.

*Fasciated Lilium auratum.*—Mr. Cecil Williams, 199 Coteford Street, Tooting, showed a plant of *Lilium auratum* with a fasciated flowering stem which bore 44 flower buds.

*Oxalis Deppei* a weed.—This plant was sent from a garden at Beckenham, where it had become a bad weed. It was suggested that hand weeding was the only remedy.

*Amaryllis* × *Parkeri alba*.—This hybrid plant was brought up. It was proposed by Sir William Lawrence and supported from the Chair and carried that the Council be asked to make some award to it for its horticultural value as apart from its botanical interest.

Mr. Worsley made some remarks on the origin of species of plants as distinct from garden hybrids. He said that the Mendelians only worked with two or three well-marked characters in hybrids, whereas with species there may be six or more well-marked distinguishing characters, and it was only when one of these characters showed a distinct break that any advance could be made.

He instanced the hybrid *Amaryllis* × *Parkeri* as an example, and said that it was not until he made a cross with a polypetalous flower that he got any result. The same thing had happened with another polypetalous *Amaryllid*. The Chairman said Mr. Worsley's remarks appeared to be similar to the conclusions of Prof. Lotsy in three lectures which he published in 1924.

SCIENTIFIC COMMITTEE, OCTOBER 6, 1925.

Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, and eight other members present.

*Cupressus Goveniana*.—Mr. J. Fraser showed specimens of *Cupressus Goveniana*, a rather uncommon conifer, from Pitch Hill.

*Nerine seedling*.—Mr. Worsley showed a seedling *Nerine* approaching a bicolor, a condition not hitherto attained in *Nerines*.

*Various plants*.—Mr. Hosking announced that it had now been ascertained that the leaf which had been sent for identification with a composite inflorescence last year did not in fact belong to the same plant. He also showed *Escallonia* × *Ingramii*, *E. exoniensis*, *Salix Bockii*, *Eleutherococcus Henryi*, and a fruiting branch of *Vitis megalophylla*.

*Virescent Dahlia*.—Mr. Preston showed a seedling *Dahlia* in which the flowers were represented by elongated shoots bearing many bracts.

*Crocus hybrid*.—Mr. Bowles showed a hybrid from Mr. Musgrave's garden which was probably *C. medius* × *C. Salzmannii*, a plant leafless when first flowering.

*Fasciated Aster*.—Mr. Yeld sent inflorescences of *Aster* with fasciated heads.

SCIENTIFIC COMMITTEE, OCTOBER 20, 1925.

Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, seven other members and Mr. C. A. JARDINE (visitor) present.

*Holly flowering*.—Mr. Jardine showed a shoot of *Holly* in flower. This is occurring in many places and follows poor flowering this spring.

*Virescent Dahlia*.—Mr. Hales showed a *Dahlia* with bracts elongated and the parts of the involucre widely separated from one another.

*Various fruits*.—Mr. Preston showed fruiting specimens of *Bryonia alba* (with black fruit), Persimmon, *Osmanthus Delavayi*, with oval black berries, *Cyclanthera pedata*, *Arbutus Unedo*, *Muehlenbeckia axillaris*, *Lonicera Kochiana*, *Margyricarpus setosus*, *Paliurus australis*, *Symphoricarpus parviflorus*, *Cucubalus baccifer*, *Jasminum Beesianum*, *J. quinquelocularis*, *Garrya elliptica*, *Solanum nigrum guinense*, *Danae racemosa*, *Thladiantha dubia*, *Glycosma platyphylla*, *Skimmia Foremanni*, *Ahebia lobata*, *Sternbergia lutea* var. *angustifolia* (in flower), *Casuarina*.

*Dolichos*.—Dr. Voelcker showed further specimens of the *Dolichos* with a large tuber which has several times been before the Committee, but which has so far not been specifically identified.

*Achimenes grandiflora* × *Gesnera zebrina*. On the suggestion of the Floral Committee a Botanical Certificate was unanimously awarded to this hybrid, sent by the Director of Parks, Glasgow.

SCIENTIFIC COMMITTEE, NOVEMBER 3, 1925.

Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, nine other members and Mr. VAN DE WEYER (visitor) present.

*Willows*.—Mr. Fraser showed dried examples of *Salix aurita* × *cinerea* type and many varieties upon it, probably the result of tertiary hybrids of many generations.

*Various plants*.—Mr. Hosking showed fruiting specimens of *Symphoricarpus occidentalis*, *Elaeagnus macrophylla*, and a *Cotoneaster* which proved to be *C. Franchetii*. Dr. Hill showed *Ilex verticillata* with many fruits. Mr. Van de

Weyer showed *Bowiea volubilis*, *Vinca difformis alba* in good form, *Narcissus papyracea*, *Hypericum Kortianum*, and a winter-flowering hybrid *Begonia* raised by crossing a tuberous rooted variety with *B. Martiana grandiflora*. Mr. Loder showed *Cyrilla racemiflora*, *Hymenanthera crassifolia*, *Stranvaesia salicifolia*.

*Fasciated Tetragona*.—Mr. Hales showed a specimen of *Tetragona echinata*, part of a plant the whole of which showed this peculiarity.

*Decaying Strawberry Leaves*.—Mr. Bowles showed on behalf of Mr. Hampton of Chesham Bois some decaying strawberry leaves which were distinctly aromatic as Bacon had described. He remarked that not all such leaves were pleasant of smell.

*Iris alata alba*.—Mr. Hay showed specimens in pots of a white variety of the south European *Iris alata*.

*Photomicrographs*.—Dr. Rodman showed photomicrographs of idioblasts in various plants with the following notes:

1. Idioblasts are more generally distributed through the various parts of plants (petiole, peduncle and leaves) in the case of plants of weakly habit of growth. In *Nymphaea alba*, *Nuphar luteum* and *Limnanthemum* idioblasts are present in the petiole, peduncle, and leaves, whereas in the robust peduncle and main petiole of *Victoria regia*, which, owing to their strength apparently requiring no reinforcement, they are entirely absent. But when the petiole of *Victoria regia* branches prior to connexion with the under surface of the midrib of the leaf the idioblasts become numerous and well developed.

2. Idioblasts have a definite relation to the air spaces, and would appear to serve the purpose of maintaining the potency of these parts.

An example of this is seen in the case of *Limnanthemum peltatum*, where the air space depicted was completely encircled by idioblasts.

In this plant, which has taken on an aquatic habit, the development of idioblasts is seen to be particularly strange. It is noteworthy that another member of Gentianaceae (*Mentyanthes trifoliata*), also aquatic in habit, appears to be devoid of idioblasts.

3. From their distribution in the leaf structure idioblasts seem to serve the purpose of maintaining a free circulation of air from the stomata (*vide* the position of idioblast processes one on either side of the stoma and its guard cells). Further, a footlike projection from the idioblast placed immediately under the cuticle is a marked feature.

4. Observations on both the immature and full matured leaves and branch petiole of *Victoria regia* appear to indicate that there is no material difference in the number and development of idioblasts present at these two periods of the plant's existence.

5. The presence of mineral matter (oxalate of lime) is more evident in idioblasts formed in *Nymphaea alba* and *Nuphar luteum* than in the other plants examined.

6. The acicular form of idioblasts seen in certain plants with their extremely fine points (very decided in the Pontederiaceae) may serve to protect the plant from animal interference.

#### SCIENTIFIC COMMITTEE, NOVEMBER 17, 1925.

Sir DAVID PRAIN, F.R.S., V.M.H., in the Chair, and five other members present.

*British Rushes*.—Mr. J. Fraser showed specimens of *Juncus capitatus* from a locality near the Lizard, Cornwall, *J. pygmaeus* from Kynance, and *J. triglumis* from Teesdale. Some discussion took place regarding the distribution of plants to apparently new localities, and the part birds play was commented upon as the only way to account for the occurrence of aquatic plants at the top of volcanoes.

*Cotoneasters*.—Mr. Hosking showed a series of *Cotoneasters* in fruit, including *C. Simonsii*, a common species in British gardens, but one for long unknown in a wild state until it was rediscovered in the Mikur Hills beyond the Khasia Hills in Northern India.

*Agrostis stolonifera*.—Dr. Voelcker commented upon the abundance of *Agrostis stolonifera*—"water grass," as it is called in some districts—in one of his fields at Woburn. He found that it could be destroyed by burying it. In certain Essex fields on clay it had been reported that this grass speedily died out when the field had a dressing of basic slag.

*Depth of seeding.*—Dr. Voelcker also drew attention to the extraordinary difference in the growth of oats when the seed was sown deeply as compared with shallow sowing, and showed specimens to illustrate his remarks.

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SCIENTIFIC COMMITTEE, DECEMBER 1, 1925.

Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, and six other members present.

*Salix triandra* and *S. amygdalina*.—Mr. Fraser showed dried specimens of these willows from various localities and made comments upon them.

*Papyrus*.—Mr. Preston showed a piece of papyrus which he had made from plants of *Cyperus Papyrus* growing in the Botanic Garden, Cambridge.

*Germinating seed of Mangrove*.—Mr. Hales showed germinating seed of Mangrove with the elongated weighted root projecting nearly a foot from the seed coats before it leaves the parent plant.

*Variegated Ash*.—Mr. Bowles showed foliage of the variegated ash, *Fraxinus pennsylvanica variegata*.

*Mr. Dykes's accident*.—The Committee unanimously desired the Secretary to convey a message of sympathy with Mr. and Mrs. Dykes in the serious accident which had befallen him.

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SCIENTIFIC COMMITTEE, DECEMBER 15, 1925.

Sir DAVID PRAIN, F.R.S., V.M.H., in the Chair, ten other members and Mr. VAN DE WEYER (visitor), present.

*The late Secretary of the Society*.—The Chairman referred in sympathetic terms to the loss the Society had suffered by the death of its Secretary, and it was unanimously resolved that the condolences of the Committee should be sent to Mrs. Dykes, the resolution being carried by the members rising in their places.

*Germination of Nelumbium speciosum*.—Mr. Hales referred to the germination of seed of *Nelumbium speciosum* received from Japan. The seed had been soaked for five hours in strong sulphuric acid and the testa had been thereafter removed. The seed thus treated had germinated within twenty-four hours.

*Quercus coccifera*.—Mr. Van de Weyer showed a young seedling of *Q. coccifera* raised from an acorn gathered by him in Portugal, where the species forms scrub up to about 7 ft. in height.

*Salix repens* forms. —Mr. Fraser showed specimens of a large number of forms which he grouped under *S. repens*, using the creeping habit of the stem as a specific character. The forms shown included *leiocarpa* with glabrous ovaries; *glabrescens*, a marsh form with glabrous leaves; *angustifolia*; *linearis*; *argentea*, a mountain and shore form; *interbasia*; *ascendens*; *parviflora*; and *fusca*. The species as defined by Mr. Fraser is extremely variable in stature, form of leaf, and hairiness.

## FRUIT AND VEGETABLE COMMITTEE.

JULY 14, 1925.

Mr. C. G. A. Nix, V.M.H., in the Chair, and thirteen other members present.

**Awards Recommended :—***Silver Hogg Medal.*

To Messrs. Bunyard, Maidstone, for Cherries.

To Messrs. Laxton, Bedford, for Strawberries and Currants.

*Silver Bunyard Medal.*

To Sir Chas. Nall-Cain, Bt. (gr. Mr. T. Pateman), Hatfield, for Cherries.

*Bronze Hogg Medal.*

To Col. B. J. Petre (gr. Mr. G. Davison), Westwick, for Black Currant 'Davison's Eight.'

**Other Exhibits.**

Messrs. Daniels, Norwich : Currants, Raspberries and Gooseberries.

Messrs. Seabrook, Chelmsford : Black Currants.

The recommendations made by the sub-committee visiting Wisley to judge the trial of Raspberries were confirmed.

FRUIT AND VEGETABLE COMMITTEE, JULY 28, 1925.

Mr. C. G. A. Nix, V.M.H., in the Chair, and eight other members present.

**Awards Recommended :—***Silver-gilt Hogg Medal.*

To Messrs. Bunyard, Maidstone, for Gooseberries.

*Silver Knightian Medal.*

To Messrs. Dobbie, Edinburgh, for flowering and seeding Vegetables.

*Bronze Hogg Medal.*

To Messrs. Laxton, Bedford, for Gooseberries and Veitchberry.

To Messrs. Hemsley, Crawley, for Gooseberries.

The Raspberry 'Brooke Bountiful,' sent by Messrs. Daniels, Norwich, was recommended for inclusion in the R.H.S. Trials at Wisley.

**Other Exhibits.**

Mr. H. Krambe, Wandsworth : Gooseberries and Currants.

Mr. E. G. Hunt, Barnstaple : Peaches and Plums on *Prunus pumila* as stock.

Hon. Vicary Gibbs (gr. Mr. E. Beckett), Elstree : Melon 'Heroine.'

FRUIT AND VEGETABLE COMMITTEE, AUGUST 11, 1925.

Mr. J. CHEAL, V.M.H., in the Chair, and fourteen other members present.

**Awards Recommended :—***Silver-gilt Hogg Medal.*

To Messrs. Bunyard, Maidstone, for Plums in pots.

*Silver-gilt Knightian Medal.*

To Messrs. Dobbie, Edinburgh, for Tomatoes in pots.

*Silver-gilt Bunyard Medal.*

To E. M. Smith, Esq. (gr. Mr. G. T. Miller), Welwyn, for Nectarines.

*Silver Hogg Medal.*

To Messrs. Laxton, Bedford, for Apples, Pears and Veitchberry.

**Other Exhibits.**

Messrs. Stuart Low, Enfield : Figs in pots.

Mr. C. Turner, Slough : Fig for opinion.

Messrs. Laxton, Bedford : Apple 'Leader.'

FRUIT AND VEGETABLE COMMITTEE, AUGUST 25, 1925.

Mr. A. H. PEARSON, V.M.H., in the Chair, and fourteen other members present.

**Awards Recommended :—**

*Gold Medal.*

To Messrs. Allgrove, Slough, for collection of fruit.

*Silver Bunyard Medal.*

To Mr. R. Staward, Ware Park Gardens, for Plums.

**Other Exhibits.**

Messrs. Laxton, Bedford : collection of fruit ; and new Apples ' Vanguard,' ' Marlboro,' ' Alpha,' ' Advance.'

Messrs. Daniels, Norwich : Currants.

Messrs. Hemsley, Crawley : Peaches, Nectarines and Plums.

Mr. B. G. Waugh, Stocksfield-on-Tyne : Tomato ' Round-as-a-Ball.'

Dr. H. J. Hinton, Heytesbury : seedling Apple.

Messrs. Stuart Low, Enfield : Apples and Figs.

Messrs. R. Veitch, Exeter : Apple-shaped Cucumber.

Mr. N. I. Baggesen, Tunbridge Wells : seedling Apple.

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FRUIT AND VEGETABLE COMMITTEE, SEPTEMBER 8, 1925.

Mr. C. G. A. NIX, V.M.H., in the Chair, and seventeen other members present.

**Awards Recommended :—**

*Gold Medal.*

To Messrs. Allgrove, Slough, for collection of fruit.

*Silver-gilt Hogg Medal.*

To Messrs. Rivers, Sawbridgeworth, for fruit trees and Vines in pots.

*Bronze Hogg Medal.*

To Messrs. Hemsley, Crawley, for Apples.

**Other Exhibits.**

Messrs. Lane, Berkhamsted : Vines in pots.

R.H.S. Gardens, Wisley : Apple ' Beely Pippin.'

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FRUIT AND VEGETABLE COMMITTEE, SEPTEMBER 22, 1925.

AT HOLLAND PARK RINK.

Mr. C. G. A. NIX, V.M.H., in the Chair, and eleven other members present.

No awards were recommended on this occasion.

**Exhibit.**

Mr. H. Chapman, Rye : Apple ' Saltcote Pippin.'

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FRUIT AND VEGETABLE COMMITTEE, SEPTEMBER 29, 1925.

AUTUMN FRUIT SHOW.

Mr. C. G. A. NIX, V.M.H., in the Chair, and twenty-two other members present.

**Awards Recommended :—**

*Silver-gilt Hogg Medal.*

To Barnham Nurseries, Barnham, for Apples.

*Silver Hogg Medal.*

To Messrs. Allgrove, Slough, for collection of fruit.

To Messrs. Hemsley, Crawley, for collection of fruit.

To the Swanley Horticultural College for collection of fruit.

To Messrs. Lane, Berkhamsted, for Apples and Grapes.

To Messrs. Rivers, Sawbridgeworth, for collection of fruit.

To Messrs. Daniels, Norwich, for Apples and Pears.



*Lindley Medal.*

To Messrs. Bunyard, for Hardy Grapes.

*Bronze Hogg Medal.*

To Lady Eva Wyndham Quin (gr. Mr. E. S. Goff), Carrick-on-Suir, Ireland, for collection of Apples and Pears.

**Other Exhibits.**

Messrs. Laxton, Bedford : new Apples.

Barnham Nurseries : Apple 'Washington Nonpareil.'

Mr. G. P. Good, Bushey : Apples.

Mr. Prince, Rugby : Apple 'Hinton Cromwell.'

Mr. A. J. Bexley, Tottenham : Apple 'Bexley Seedling.'

Lord Suffield (gr. Mr. Allen), Norwich : Black and White seedling Grapes. (The Black form was recommended to be sent to Wisley for trial.)

Mr. G. R. Dyke, Milborne Port : Apples 'Blake' and 'Turton.'

Mr. H. Wigley, Gravesend : Apples 'Pekin,' 'Welling,' 'Wellborn,' 'King's Cross.'

Mr. E. Burden, Patney : Apples 'Burden's Alpha,' 'Beauty of Wilts,' and 'Golden Queen.'

Mr. A. Paris, Watford : Apples 'Gomers College Seedling' and 'Humphrey Seedling.'

Mr. D. Capern, Putney : Apple 'Capern's Seedling.'

Mr. H. A. Dimmick, Southampton : Apple 'Heath Pippin.'

Mr. H. G. Longford, Abingdon : Apple 'Longford's Aromatic.'

Mr. W. Tayler, Godalming : Apples 'Pantia Ralli' and 'Joy Bells.'

Mr. W. Stacey, Earlsfield : seedling Apple.

## FRUIT AND VEGETABLE COMMITTEE, OCTOBER 6, 1925.

Mr. C. G. A. Nix, V.M.H., in the Chair, and fourteen other members present.

**Awards Recommended :—***Gold Medal.*

To Hon. Vicary Gibbs (gr. Mr. E. Beckett), Elstree, for Vegetables.

To F. C. Stoop, Esq. (gr. Mr. G. Carpenter), Byfleet, for collection of Apples.

*Silver-gilt Knightian Medal.*

To Messrs. Dobbie, Edinburgh, for Potatoes.

*Silver Hogg Medal.*

To Lady Henry (gr. Mr. W. E. Hewitt), Henley, for collection of Apples.

**Other Exhibits.**

Mr. A. E. Hirst, Chiswick : seedling Apple.

Lady Henry, Henley : seedling Apple.

Mr. J. Kettle, Dorset : Raspberry 'Lloyd George.'

Mr. G. Trinder, Fleet : Raspberry 'Golden Hornet.'

The following awards to First Early Culinary Peas, after trial at Wisley, were confirmed :

*First-class Certificate.*

Laxton's Superb from Messrs. Hurst, Nutting, Dobbie, W. H. Simpson, Kelway, Barr, and Mr. H. J. Speed.

Superb Reselected, from Messrs. J. Carter, Raynes Park.

*Award of Merit.*

Tip Top, from Messrs. Kelway, Cullen, Harrison, and Speed.

Bedford Champion, from Messrs. Laxton, Hurst, W. H. Simpson, Dobbie, and Kelway.

*Highly Commended.*

Kelvedon Wonder (for small gardens), from Messrs. Hurst, Dobbie, and R. Veitch.

Blue Bird, from Messrs. Cullen, Nutting, A. Dickson, Harrison, and Kelway.

British Lion, from Messrs. Hurst, Johnson, and Kelway.

CX PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

Early Duke, from Messrs. J. Carter.

Gradus, from Messrs. Morse, W. H. Simpson, Barr, Kelway, and Hurst.

Express, from Messrs. Dobbie.

*Commended.*

Velocity, from Messrs. Hurst.

Superior, from Messrs. J. Carter.

Thomas Laxton, from Messrs. Hurst, Nutting, Morse, Dobbie, Johnson, Kelway, and Cullen.

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FRUIT AND VEGETABLE COMMITTEE, OCTOBER 20, 1925.

Mr. J. CHEAL, V.M.H., in the Chair, and fourteen other members present.

**Awards Recommended :—**

*Silver Knightian Medal.*

To Messrs. Sutton, Reading, for Cabbages and Savoy.

*Bronze Hogg Medal.*

To Messrs. Brockwell & Lockyer, Orpington, for Apples.

*Award of Merit.*

To Apple 'Lord Lambourne' from Messrs. Laxton, Bedford. This new apple is the result of a cross between 'James Grieve' and 'Worcester Pearmain'; in season in October and November. It is highly coloured, with a brilliant red flush over nearly the whole of the skin, which is yellow. The eye is partly closed, set in a medium basin, and the stalk is about  $\frac{3}{4}$  of an inch long and set in a deep and rather broad cavity. The flavour is good, the flesh crisp and juicy. This variety is said to be a healthy and strong grower and a very heavy cropper. The award is provisional and subject to a favourable report by a deputation which will inspect the trees next autumn.

**Other Exhibits.**

Mr. J. Hale, Royston : seedling Apple.

Mr. T. G. Bullock, Leicester : seedling Apple.

Mr. F. Douglas, Northampton : seedling Apple.

Mr. J. Royce, Danbury : seedling Apple.

Viscount Elveden (gr. Mr. Auton), Pyrford Court, Woking : collection of vegetables grown without farmyard manure.

Mr. W. Jennings, Reading : seedling Apple.

Mr. A. E. Hirst, Chiswick : seedling Apple.

Mr. J. Kettle, Corfe Mullen : Raspberry 'Lloyd George.'

Mr. G. Trinder, Fleet : Raspberry 'Golden Hornet.'

Lady Thornycroft, Bembridge, I. of W. : Apples 'Lord Roberts' and 'King George V.'

Mr. C. C. Watts, Northwood : seedling Apple.

The recommendations made by the sub-committee visiting Wisley to judge the trial of second early potatoes were confirmed.

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FRUIT AND VEGETABLE COMMITTEE, NOVEMBER 3, 1925.

Mr. C. G. A. NIX, V.M.H., in the Chair, and eighteen other members present.

**Award Recommended :—**

*Silver-gilt Hogg Medal.*

To Sir Chas. Nall-Cain, Bt. (gr. Mr. Pateman), Brockett Hall, Hatfield, for collection of Fruit.

**Other Exhibits.**

Mr. W. Tayler, Godalming : Apple 'Joybells.'

Mr. W. Crump, Malvern : Apple 'Hopton Court.'

Messrs. Laxton, Bedford : Apple 'Delight.'

Mr. H. Bridges, King's Lynn : seedling Apple.

Mr. S. Gale, Dorchester : Apple 'Pomeroy.'

F. C. Stoop, Esq. (gr. Mr. G. Carpenter), Byfleet : Apples 'George Carpenter' and 'Victory.'

F. Pye, Esq., Ferndown, Dorset : seedling Apple.

Mr. W. H. Divers, V.M.H., Hook : Apple 'Barnack Orange.'

## FRUIT AND VEGETABLE COMMITTEE, NOVEMBER 17, 1925.

Mr. J. CHEAT, V.M.H., in the Chair, and ten other members present.

**Award Recommended :—**

*Silver-gilt Hogg Medal.*

To Hon. Vicary Gibbs (gr. Mr. E. Beckett), Aldenham House, Elstree, for collection of Fruit.

**Other Exhibits.**

Messrs. Geo. Bunyard, Maidstone : Apples in season.  
 Mr. G. Leach, East Grinstead : seedling Apple.  
 Mr. R. C. French, Bangor : Apple 'Cox's Orange Pippin.'  
 Messrs. Brinkman, Chertsey : Apples 'Victory' and 'George Carpenter.'  
 Mr. W. H. Divers, V.M.H., Hook : Apples 'Madresfield Court,' 'Adams Pearmain' and 'Tun Apple,' for comparison.

The recommendations made by the sub-committee visiting Wisley to judge the trial of Turnips were confirmed.

## FRUIT AND VEGETABLE COMMITTEE, DECEMBER 1, 1925.

Mr. C. G. A. NIX, V.M.H., in the Chair, and seventeen other members present.

No awards were recommended on this occasion.

**Exhibits.**

Messrs. Geo. Bunyard, Maidstone : Apples in season.  
 Messrs. Laxton, Bedford : collection of Apples.  
 Mr. H. Bridges, King's Lynn : Apple 'Magdalen.'  
 Mr. V. G. Stapleton, Stamford : Persimmons grown out of doors.  
 Capt. B. Drummond, Southampton : Apple 'Cadland Reinette.'  
 Pickering Cottage Preserves, Maidstone : Preserves.  
 Miss H. G. Sewell, South Kensington : Preserves.  
 Miss D. Carter, Peasmarsh : Jams and Preserves.  
 Mrs. Fleming, Uxbridge : Jams.  
 Messrs. E. Westmacott, Charing Cross : South African Preserves.  
 Mrs. Miller, Marlow : Jams.

## FRUIT AND VEGETABLE COMMITTEE, DECEMBER 15, 1925.

Mr. C. G. A. NIX, V.M.H., in the Chair, and nine other members present.

No awards were recommended on this occasion.

**Exhibits.**

Messrs. Geo. Bunyard, Maidstone : Apples in season.  
 Mr. J. P. Brand, Long Melford : seedling Apple.  
 Mr. T. Cross, Bury St. Edmunds : Apples.  
 Lady Thornycroft, Bembridge, I. of W. : seedling Apple.  
 Pickering Cottage Preserves, Maidstone : Preserves.  
 Messrs. E. Westmacott, Charing Cross : South African Preserves.  
 Miss H. G. Sewell, South Kensington : Preserves and Jams.  
 Mrs. Miller, Marlow : Jams and Preserves.  
 Mrs. Fleming, Uxbridge : Jams.

# FLORAL COMMITTEE.

JULY 14, 1925.

## Section A.

Mr. H. B. MAY, V.M.H., in the Chair, and fourteen other members present.

### Awards Recommended :—

#### Gold Medal.

To Messrs. Dobbie, Edinburgh, for Sweet Peas.

#### Silver-gilt Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. Chaplin, Waltham Cross, for Roses.

To Mr. J. Douglas, Great Bookham, for Border Carnations.

To Mr. H. J. Jones, Lewisham, for Phloxes.

To Messrs. Ladhams, Southampton, for hardy plants.

To Mr. J. H. Pemberton, Havering, for Roses.

#### Silver Banksian Medal.

To Messrs. Bide, Farnham, for Sweet Peas.

To Mr. T. Carlile, Twyford, for Delphiniums.

To Chalk Hill Nursery, Reading, for hardy plants.

To Mr. J. R. Crowhurst, Burgess Hill, for Border Carnations.

To Messrs. Easlea, Leigh-on-Sea, for Roses.

To Mr. C. Engelmann, Saffron Walden, for Carnations.

To Mr. C. H. Herbert, Birmingham, for Pinks.

To Messrs. Prichard, Christchurch, for hardy plants.

To Mr. W. Ormiston Roy, Montreal, for Canadian Pæonies.

To Messrs. Russell, Richmond, for stove plants.

To Messrs. Waterer, Sons & Crisp, Twyford, for Phloxes.

To Mr. Yandell, Maidenhead, for Violas.

#### Bronze Banksian Medal.

To Mr. T. P. Edwards, Southgate, for Roses.

To Messrs. Kelway, Langport, for Delphiniums.

To Messrs. Rich, Bath, for hardy plants.

To Messrs. Tucker, Oxford, for hardy plants.

#### Award of Merit.

To *Nepeta* 'Paul Chandon' (votes unanimous), from Mr. F. G. Wood, Ashted. This plant, believed to be of French origin, is useful for cutting or for growing in the border. Its height is about one foot and its large blue flowers look particularly effective under artificial light.

To Rose 'Dainty Bess' (votes unanimous), from Mr. W. E. B. Archer, Ashford. A very dainty H.T. single variety raised by the exhibitor as the result of a cross between 'Ophelia' and 'K. of K.' It is well adapted for table decoration and for bedding. The blooms are borne in clusters and are coppery-red in bud, opening to a pleasing shrimp-pink with rose-red markings on the reverse. The petals are frilled and the stamens bright crimson. The growth is vigorous and upright and the plant is said to be perpetual flowering.

The awards recommended to Delphiniums on trial at Wisley were confirmed. For descriptions see R.H.S. JOURNAL, vol. 51, p. 124.

### Other Exhibits.

Mr. A. Blandford, W. Horsley : Sweet Peas.

Col. O. Bradford, Lustleigh : Pelargonium 'Welparke Beauty.'

Mr. W. H. Gardiner, Thorrington : *Eschscholzia* 'Enchantress' and E 'Nil Simile.'

Messrs. Hewitt, Solihull : Delphinium 'Joy Bells.'

Misses Hopkins, Shepperton : hardy plants.

Messrs. Hurst, London : *Eschscholzia erecta compacta caniculata* 'Maize Queen.'

Mr. M. Mitchener, Purley : Erigeron 'Purley Beauty.'

Mr. W. H. Smith, Chichester : Carnation 'Marjorie Smith.'

Messrs. Stark, Fakenham : *Sidalceas*.

Messrs. Thompson & Morgan, Ipswich : *Gaillardia* 'Ipswich Beauty.'

## Section B.

Mr. W. J. BEAN, V.M.H., in the Chair, and thirteen other members present.

## Awards Recommended:—

*Silver-gilt Banksian Medal.*

To Mr. G. Reuthe, Keston, for Lilies, alpines and shrubs.

*Silver Banksian Medal.*

To Mr. F. G. Wood, Ashted, for alpines and shrubs.

*Silver Lindley Medal.*

To Lt.-Col. Messel, O.B.E. (gr. Mr. J. Coniber), Handcross, for *Lilium Duchartrei* var. *Farreri*.

*Award of Merit.*

To *Hemerocallis* 'Radiant' (votes 8 for, 1 against), from G. Yeld, Esq., Gerrard's Cross. A hybrid having *H. Thunbergii* as the seed parent. The plant is very floriferous and bears slightly fragrant large light orange flowers.

To *Hoya bella* (votes 9 for), from Messrs. Russell, Richmond. This, the most lovely of all the Hoyas, is a native of India. It is of branching bushy habit and well furnished with very short-stalked, dark green, ovate opposite leaves. The flowers are borne freely in umbels and consist of a pure white waxy corolla with a deep purple corona.

To *Pistorinia intermedia* (votes 7 for), from L. Johnston, Esq., Campden. This plant is also known as *Cotyledon hispanica*. Its stems are straggling, about 1 foot high, succulent, bearing *Sedum*-like leaves. The flowers are borne in numerous corymbs and are bright yellow, minutely dotted and tipped with red.

To *Salvia dichroa* (votes unanimous), from the University Botanic Garden, Cambridge. This interesting herbaceous plant comes from the Atlas Mountains, North Africa. It is of erect growth and from 2 to 3 feet high. The ovate-lanceolate leaves are very irregularly sinuate-serrate and pubescent. The pretty flowers are borne in whorls and have the upper lip of the corolla bright blue and the lateral lobes of the lower lip pale blue, while the middle one is white and pendulous.

## Other Exhibits.

Mr. Dixon, Putney: alpines.

Messrs. Lucas & Hill, Worthing: *Lavandula Lucilla*.

Mrs. P. Martineau, Ascot: Delphiniums and *Salvia Sclarea*.

Mr. A. V. Neve, Groombridge: *Cryptomeria japonica nana albo-variegata*.

Mr. E. Scaplehorn, Beckenham: *Fuchsia pumila*, *Campanula velutina*.

Miss E. Willmott, V.M.H., Warley: *Sollya Drummondii*.

## FLORAL COMMITTEE, JULY 28, 1925.

## Section A.

Mr. H. B. MAY, V.M.H., in the Chair, and twelve other members present.

## Awards Recommended:—

*Gold Medal.*

To Mr. H. J. Jones, Lewisham, for Phloxes.

To Messrs. Kelway, Langport, for Gladioli.

*Silver-gilt Banksian Medal.*

To Messrs. Daniels, Norwich, for annuals.

To Mr. A. Perry, Enfield, for Water Lilies.

To Messrs. Russell, Richmond, for stove plants.

To Mr. W. J. Unwin, Histon, for Gladioli.

To Messrs. Waterer, Sons & Crisp, Twyford, for Roses.

*Silver Banksian Medal.*

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. Chaplin, Waltham Cross, for Roses.

To Messrs. Engelmann, Saffron Walden, for Carnations.

To Hon. Vicary Gibbs, Elstree, for Phloxes.  
 To Messrs. Ladhams, Southampton, for hardy plants.  
 To Messrs. S. Low, Enfield, for Carnations.  
 To Messrs. Lowe & Gibson, Crawley Down, for Carnations and Gladioli.  
 To Mr. J. H. Pemberton, Havering, for Roses.  
 To Messrs. Prichard, Christchurch, for hardy plants.  
 To Mr. Yandell, Maidenhead, for Violas.

*Bronze Banksian Medal.*

To F. Lloyd, Esq., Croydon, for *Begonia Lloydii* hybrids.  
 To Messrs. Rich, Bath, for Phloxes.  
 To Mr. F. G. Wood, Ashted, for hardy plants.

*Award of Merit.*

To Gladiolus 'Martha Washington' (votes unanimous), from Major G. Churcher, Lindfield. A warm light red variety with dark, almost black, velvety blotches on the lower petals. The flowers open many at a time and are borne on a straight spike 4 feet 3 inches high. The average number of pips is 16. This variety was raised by Messrs. Vaughan of Chicago.

To Gladiolus 'Mrs. James Kelway' (votes 7 for, 3 against), from Messrs. Kelway, Langport. A large white variety with pale lilac streaks down the middle of the lower petals. The flowers are borne in a good bold spike.

**Other Exhibits.**

Sir E. Downer, Bt., Manchester : seedling *Armeria*.  
 Mr. H. Hemsley, Crawley : *Sidalceas*.  
 Misses Hopkins, Shepperton : hardy plants.  
 Messrs. G. Kent, Walton : Border Carnations.  
 Mr. M. Nicholls, Kemsing : *Delphinium* 'St. Clere.'  
 Mr. R. C. Notcutt, Woodbridge : *Astilbe* 'King Albert,' A.M. 1922.  
 A. Tatham, Esq., Nottingham : *Carnation* 'White Witch.'

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*Section B.*

Mr. W. J. BEAN, V.M.H., in the Chair, and twelve other members present.

**Awards Recommended :—**

*Award of Merit.*

To *Dipteronia sinensis* (votes unanimous), from G. W. E. Loder, Esq., Ardingly. A small deciduous tree from Central China. On the present occasion it was shown in fruit. The reddish fruits are produced in large clusters and much resemble those of the Wych-elm. Its foliage is very beautiful, consisting of large opposite pinnate leaves from 9 to 12 inches long. The flowers are very small and greenish-white. The plant is quite hardy.

To *Veronica hybrida carnea* (votes 6 for, 2 against), from Messrs. Ladhams, Southampton. This beautiful hardy shrub originated in the garden of Hon. Mrs. Dudley Ryder at Beaulieu. Its flowers are of a very pretty pale pink shade and they are produced very abundantly.

**Other Exhibits.**

Cambridge Botanic Garden : *Anaphalis yedoensis*, *Coriaria japonica*, A.M. 1908.

Mr. R. C. Notcutt, Woodbridge : *Buddleias*.

Major A. Pam, Broxbourne : *Coriaria japonica*, A.M. 1908.

Mr. A. Perry, Enfield : *Hemerocallis* 'Maggie Perry' and H. 'George Yeld.'

W. Van de Weyer, Esq., Dorchester : *Hordeum lusitanicum*.

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FLORAL COMMITTEE, AUGUST 11, 1925.

*Section A.*

Mr. H. B. MAY, V.M.H., in the Chair, and seventeen other members present

**Awards Recommended :—**

*Gold Medal.*

To Messrs. Bath, Wisbech, for Gladioli.

To Messrs. Sutton, Reading, for Gladioli.

*Silver-gilt Banksian Medal.*

- To Messrs. A. Dickson, Newtownards, for Roses.
- To Hon. Vicary Gibbs, Elstree, for Phloxes.
- To Messrs. Kelway, Langport, for Gladioli.
- To Mr. A. Perry, Enfield, for Nymphæas and herbaceous plants.

*Silver Banksian Medal.*

- To Mr. A. Edwards, Fordham, for Gladioli.
- To Mr. H. J. Jones, Lewisham, for Phloxes.
- To Mr. J. H. Pemberton, Havering, for Roses.
- To Messrs. Prichard, Christchurch, for hardy plants.
- To Mr. G. G. Whitelegg, Chislehurst, for Gladioli.

*Bronze Banksian Medal.*

- To Messrs. Allwood, Haywards Heath, for Carnations.
- To Mr. T. Carlile, Twyford, for Delphiniums.
- To Messrs. Chaplin, Waltham Cross, for Roses.
- To Messrs. Cheal, Crawley, for hardy plants.
- To Major Churcher, Lindfield, for Gladioli.
- To Messrs. Engelmann, Saffron Walden, for Carnations.
- To Messrs. Low, Enfield, Agapanthus and Liliums.
- To Messrs. Lowe & Gibson, Crawley Down, for Gladioli.

*Award of Merit.*

To Phlox 'H. B. May' (votes unanimous), from Mr. H. J. Jones, Lewisham. A very beautiful variety of dwarf compact habit. It produces large heads of soft mauve flowers with slight rosy-carmine markings along the edges of the petals.

To *Sidalcea* 'Hiawatha' (votes 12 for, 1 against), from Messrs. Stark, Fakenham. A useful herbaceous plant of good habit growing about 2 feet high. Its medium sized crimson flowers with white zones are borne very freely.

The awards recommended to Sweet Peas on trial at Wisley were confirmed. For descriptions see R.H.S. JOURNAL, vol. 51, p. 109.

The following Dahlias were selected by the Joint Committee for trial at Wisley :—

From Messrs. Cheal, Crawley :

'Colegate Star' (Star), 'Duchess of York' (Single).

**Other Exhibits.**

Mr. W. E. Fawcett, Lichfield : seedling Carnations.

Misses Hopkins, Shepperton : hardy plants.

The Orpington Nurseries, Orpington : *Gladiolus Lemoinei* 'Margaret Moor.'

*Section B.*

Mr. C. T. MUSGRAVE in the Chair, and thirteen other members present.

**Awards Recommended :—***Silver Banksian Medal.*

- To Mr. G. Reuthe, Keston, for shrubs.
- To Messrs. Russell, Richmond, for shrubs.

*Award of Merit.*

To *Campanula* 'Warley' *alba* (votes unanimous), from Messrs. Prichard, Christchurch. A dwarf-growing variety suitable for the rock garden. The leaves are small and the plants only a few inches high. The relatively large, flattish, white flowers are borne with great freedom.

To *Gilia californica* (votes unanimous), from T. Hay, Esq., Hyde Park, W. This very beautiful and uncommon procumbent shrub was introduced by William Lobb from California in 1854. The plant is densely covered with fasciculated foliage which at flowering time is almost hidden by the wealth of pretty rose-pink Phlox-like flowers.

To *Lilium Bakerianum* (votes unanimous), from Messrs. Wallace, Tunbridge Wells. A rare tender Lily from Upper Burma. It is a graceful erect plant about 2 feet in height, and carries a solitary drooping widely expanded fragrant flower of which the segments are pure white except for tiny chocolate dots in the tube. The linear deep green leaves are quite short.

To *Rhododendron serotinum* (votes unanimous), from the Director, Royal Botanic Gardens, Kew. A valuable late flowering hardy shrub from Western China. Seeds were first collected by Père Delavay in the late 'eighties. The plants growing at Kew were obtained from Le Jardin des Plantes, Paris, in 1880. They produce large trusses of from 6 to 8 fragrant flowers, which are white slightly flushed with rose on the outside and blotched and tinged with red inside the tube. The leaves are oblong-elliptic, slightly and unequally cordate at the base, dull green above and glaucous-green beneath. The growth is long and straggling.

To *Sphaeralcea Fendleri*, Hascombe variety (votes unanimous), from C. T. Musgrave, Esq., Godalming. An uncommon and useful border plant of shrubby habit. It bears abundant Malva-like orange-coloured flowers. It is a seedling from *S. Fendleri*, but its blooms are much larger than those of the type.

#### Other Exhibits.

Cambridge Botanic Garden : *Campanula macrostyla*.

Royal Botanic Gardens, Kew : *Rhododendron auriculatum*, A.M. 1922.

FLORAL COMMITTEE, AUGUST 25, 1925.

#### Section A.

Mr. H. B. MAY, V.M.H., in the Chair, and fifteen other members present.

#### Awards Recommended :—

##### *Silver-gilt Banksian Medal.*

To Messrs. Bath, Wisbech, for Gladioli.

To Messrs. Velthuys, Hillegom, Holland, for Gladioli.

##### *Silver Banksian Medal.*

To Messrs. Chaplin, Waltham Cross, for Roses.

To Messrs. Cheal, Crawley, for Dahlias.

To Messrs. Grullemans, Lisse, Holland, for Gladioli.

To Messrs. Kelway, Langport, for Gladioli.

To Messrs. Konijnenburg & Mark, Noordwijk, Holland, for Gladioli.

To Messrs. Ladhams, Southampton, for hardy plants.

##### *Bronze Banksian Medal.*

To Messrs. Carter Page, London, for Dahlias.

To Messrs. Engelmann, Saffron Walden, for Carnations.

To Orpington Nurseries, Orpington, for Gladioli.

To Mr. J. H. Pemberton, Havering, for Roses.

To Messrs. Prichard, Christchurch, for hardy plants.

To Mr. G. Reuthe, Keston, for hardy plants.

To Messrs. Stoutenbeck, Hillegom, Holland, for Gladioli.

To Messrs. Stredwick, St. Leonards, for Dahlias.

To Mr. J. T. West, Brentwood, for Dahlias.

To Mr. F. G. Wood, Ashted, for hardy plants.

##### *Award of Merit.*

To Gladiolus 'Queen of Somerset' (votes unanimous), from Messrs. Kelway, Langport. A large creamy-white variety of excellent form.

To Phlox 'Annie Laurie' (votes unanimous), from Hon. Vicary Gibbs, Elstree. A very pleasing large salmon-pink variety with a purplish eye. It was raised in the gardens of Aldenham House.

To *Physostegia speciosa rosea* 'Ladham's variety' (votes 6 for, 3 against), from Messrs. Ladhams, Southampton. A striking hardy plant of tall branching habit, useful for the herbaceous border and for cutting. It is crowded with small deep rosy-pink flowers.



The following Dahlias were selected by the Joint Committee for trial at Wisley :—

From Messrs. Cheal, Crawley :

‘Cheal’s Pink’ (Dec.).

From Mr. A. J. Cobb, Reading :

‘Cintra’ (Min. Pæony), ‘St. Andrews’ (Min. Pæony), ‘Mrs. John Crossling’ (Min. Pæony).

From Messrs. Stredwick, St. Leonards :

‘Evelyn Hancock’ (Dec.), ‘Harry Strutt’ (Cactus), ‘Henry B. May’ (Dec.), ‘J. Emberson’ (Cactus), ‘Mary Murray’ (Cactus), ‘Nobility’ (Cactus), ‘Rotation’ (Cactus), ‘Sheik’ (Dec.), ‘Stedfast’ (Dec.).

#### Other Exhibits.

Messrs. Allwood, Haywards Heath : Carnations.

Mr. H. Hemsley, Crawley : Dahlias.

Misses Hopkins, Shepperton : hardy plants.

Mr. C. Kirch, Beckenham : Dianthus ‘Spark.’

Messrs. S. Low, Bush Hill Park : Carnations.

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#### Section B.

Mr. C. T. MUSGRAVE in the Chair, and ten other members present.

#### Award Recommended :—

*Silver Banksian Medal.*

To Mr. G. Reuthe, Keston, for shrubs

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FLORAL COMMITTEE, SEPTEMBER 8, 1925.

#### Section A.

Mr. H. B. MAY, V.M.H., in the Chair, and eleven other members present.

#### Awards Recommended :—

*Silver-gilt Banksian Medal.*

To Orpington Nurseries, Orpington, for Gladioli.

*Silver Banksian Medal.*

To Messrs. Bath, Wisbech, for Gladioli.

To Messrs. Chaplin, Waltham Cross, for Roses.

To Mr. A. Edwards, Fordham, for Gladioli.

To Messrs. Ladhams, Southampton, for hardy plants.

To Messrs. Carter Page, London, for Dahlias.

To Mr. J. H. Pemberton, Havering, for Roses.

To Messrs. Prichard, Christchurch, for hardy plants.

To Messrs. Wheatcroft, Gedling, for Roses.

To Mr. H. Woolman, Birmingham, for Dahlias.

*Bronze Banksian Medal.*

To Chalk Hill Nurseries, Reading, for hardy plants.

To Messrs. Gill, Falmouth, for Lilies.

To Messrs. House, Westbury-on-Trym, for Scabious and Kniphofias.

To Mr. Lilley, Slough, for Roses.

To Mr. J. B. Riding, Chingford, for Dahlias.

To Royal Dutch Dahlia Union, for Dahlias.

To Mr. F. G. Wood, Ashted, for hardy plants.

To Messrs. Waterer, Sons & Crisp, Twyford, for Dahlias.

To Mr. Yandell, Maidenhead, for Violas.

*Award of Merit.*

To *Chrysanthemum* ‘Cranford’ (votes unanimous), from Mr. W. T. A. Roots, Cranford. A very useful Decorative variety growing from 3 to 4 feet high. Its medium-sized, bright golden-yellow flowers are produced in great profusion.

To *Gladiolus* ‘Tess’ (votes unanimous), from the Orpington Nurseries Co.,

Orpington. This beautiful variety was raised by Mr. A. J. Bliss. Its colour is pale rosy-mauve with crimson markings at the base and cream blotches on the lower petals.

The following Dahlias were selected by the Joint Committee for trial at Wisley :—

From Mr. A. J. Cobb, Reading :  
' Charles E. Pearson ' (Min. Pæony), ' Lulu ' (Min. Pæony).

#### Other Exhibits.

Messrs. Allwood, Haywards Heath : Carnations.  
Messrs. W. & J. Brown, Stamford : Gaillardias.  
Mr. T. Carlile, Twyford : Delphiniums.  
Messrs. Cheal, Crawley : Dahlias.  
Messrs. Engelmann, Saffron Walden : Carnations.  
Mr. C. Frikart, Stafa, Switzerland : Asters.  
Mr. H. Hemsley, Crawley : Dahlias.  
Misses Hopkins, Shepperton : hardy plants.  
Miss P. Inkster, Totnes : Carnations.

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#### Section B.

Mr. C. T. MUSGRAVE in the Chair, and thirteen other members present.

#### Awards Recommended :—

*Silver Banksian Medal.*

To Messrs. L. R. Russell, Richmond, for shrubs and Clematis.

*Award of Merit.*

To *Hermannia candicans* (votes 6 for), from Sir William Lawrence, Bt., Dorking. An interesting tender shrub suitable for a wall. It is a native of South Africa and has bright yellow flowers tinged with orange when fully open. Its leaves are small, ovate-oblong, long petioled and prominently veined.

To *Indigofera pendula* (votes unanimous), from R. Cory, Esq., Cardiff. A charming and very graceful shrub of spreading habit, first collected by the Père Delavay in Yunnan in 1887. It was later sent home by Mr. G. Forrest. It bears long, slender, pendulous axillary racemes of rose purple papilionaceous flowers. The leaves, which are about 10 inches long, are composed of a number of pairs of small oblong-elliptic leaflets.

#### Other Exhibits.

Dame Alice Godman, O.B.E., Horsham : plant from Uganda.

Messrs. Hurst, London : *Papaver anomalum*, a Chinese species differing from *P. nudicaule* in its broader, shorter capsule, which is entirely glabrous, the stigmatic disc of which has a circular, not an incised margin.

C. H. Williams, Esq., Tooting : fasciated *Lilium auratum*.

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#### DAHLIA SHOW, SEPTEMBER 9, 1925.

The following Dahlias were selected by the Joint Committee for trial at Wisley :—

From Messrs. Ballego, Leiden, Holland :  
' Secretary Voors ' (Dec.).  
From Messrs. Bruidegom, Baarn, Holland :  
' La France ' (Dec.), ' Pink Favourite ' (Dec.).  
From Messrs. Carlée, Heemsted, Holland :  
' Rose Elegance ' (Dec.).  
From Messrs. Cheal, Crawley :  
' Fanfare ' (Single), ' Kingcup ' (Mignon), ' Mabel Mary ' (Coll.),  
' Mrs. E. Blount ' (Pæony), ' Mrs. H. C. Scrimgeour ' (Min. Pæony),  
' Murillo ' (Pom.), ' Princess ' (Pom.), ' Rowley Star ' (Star), ' Yellow Queen ' (Min. Pæony).  
From Messrs. Geijsendorpher, Baarn, Holland :  
' MacDonald ' (Dec.).

- From Messrs. Hornsneeld, Baarn, Holland :  
 'Turkoois' (Cactus).  
 From W. H. Johns, Esq., Bermondsey :  
 'Coltness Salmon' (Mignon).  
 From Messrs. Kroon, Baarn, Holland :  
 'Firebrand' (Cactus).  
 From Mr. H. Shoesmith, Mayford :  
 'Dignity' (Cactus), 'Dove' (Cactus), 'Fairy' (Cactus), 'Floria'  
 (Cactus), 'Gaiety' (Cactus), 'Gloriosa' (Dec.), 'Nero' (Cactus).  
 From Messrs. Stredwick, St. Leonards :  
 'Clarion' (Dec.), 'Elite' (Cactus), 'Homeric' (Dec.), 'Margaret'  
 (Cactus), 'Marie King' (Dec.), 'Rover' (Cactus).  
 From Mr. C. Turner, Slough :  
 'Apollyon' (Dec.), 'Don' (Star), 'Falka' (Min. Pæony), 'Fantasy'  
 (Star), 'Festus' (Pæony).  
 From Mr. H. Woolman, Birmingham :  
 'Lady Aileen' (Coltness Seedling).  
 From Messrs. Wouters, Nijkerk, Holland :  
 'Correct' (Cactus).

Dahlias were also submitted by the following :—

- Mr. H. Brown, Luton.  
 Mr. J. Garland, West Byfleet.  
 Messrs. Jarman, Chard.  
 Messrs. Topsvoort, Aalsmeer, Holland.  
 Messrs. van Herwaarden, Baarn, Holland.

FLORAL COMMITTEE, SEPTEMBER 22, 1925.

At Holland Park Skating Rink.

*Section A.*

Mr. H. B. MAY, V.M.H., in the Chair, and fourteen other members present.

**Awards Recommended :—**

*Award of Merit.*

To Chrysanthemum 'Crimson Circle' (votes unanimous), from Mr. A. W. Thorpe, Lichfield. A rich crimson Decorative variety with very full round flowers.

To Chrysanthemum 'Fire Crest' (votes unanimous), from Mr. A. W. Thorpe, Lichfield. A good Decorative variety of a reddish-bronze colour with a golden reverse, which shows in the centre of the flower where the florets are incurved.

To Chrysanthemum 'Mayford White' (votes unanimous), from Mr. H. Shoesmith, jun., Mayford. An excellent early flowering outdoor white variety of very good substance and shape.

To Chrysanthemum 'Pink Dame' (votes unanimous), from Mr. A. W. Thorpe, Lichfield. A very pleasing pink early flowering variety with slightly quilled florets.

To Gloxinia 'Beacon' (votes unanimous), from Messrs. Sutton, Reading. The handsome bright velvety crimson flowers of this variety are large and very freely produced on short stems, which carry them just clear of the foliage.

To Gloxinia 'Mauve Queen' (votes unanimous), from Messrs. Sutton, Reading. Another very fine variety of similar form to the above, but having rosy-mauve flowers with white throats.

To Kniphofia 'H. G. Mills' (votes unanimous), from Messrs. Baker, Codsall. A useful addition to these striking hardy herbaceous plants. It is a seedling of *K. corallina* and produces medium-sized heads of brilliant fiery-red flowers. Its flowering season extends from August to October and its height is about 5 feet.

The following Dahlias were selected by the Joint Committee for trial at Wisley :—

From Messrs. Cheal, Crawley.

'Hyde Star' (Star), 'Milton Star' (Star), 'Purple Star' (Star).

From A. J. Cobb, Esq., Reading :  
 ' Elma Cook ' (Min. Paony).  
 From Messrs. Burrell, Cambridge :  
 ' Ada,' ' Baroda,' ' Clara,' ' Hermia,' ' Nanny,' ' Thora ' (all Charm Dahlias).  
 From Messrs. Treseder, Cardiff :  
 ' Mrs. Frank Duncan ' (Charm).  
 From Mr. C. Turner, Slough :  
 ' Phaon ' (Dec.).

#### Other Exhibits.

Messrs. Allwood, Haywards Heath : Carnation ' Shot Silk,' A.M. April 7, 1925.  
 Major G. Churcher, Lindfield : Gladiolus ' Mrs. Frederick Peters.'  
 Messrs. Forbes, Hawick : Geranium ' Salmon Black Vesuvius.'  
 Mr. C. Frikart, Stafa, Switzerland : Asters.  
 Messrs. Godfrey, Exmouth : Chrysanthemum ' Moonbeam.'  
 Mr. C. A. Jardine, London : Roses.  
 Messrs. Lane, Berkhamsted : Rose ' Mrs. Henry Lane.'  
 Mr. W. H. Lee, Enniskerry : Dahlia ' Powerscourt Yellow.'  
 Messrs. McGredy, Portadown : Roses ' Arthur Cook ' and ' Patience.'  
 Messrs. W. Peters, Leatherhead : Chrysanthemum ' September Pink.'  
 Messrs. Stredwick, St. Leonards : Dahlias.  
 Messrs. Waterer, Sons & Crisp, Twyford : *Clematis hieracleifolia* ' Ultramarine.'  
 Mr. H. Woolman, Birmingham : Chrysanthemums.

#### Section B.

Mr. C. T. MUSGRAVE in the Chair, and twelve other members present.

#### Awards Recommended :—

To *Beaufortia decussata* (votes unanimous), from Rev. A. T. Boscawen, Ludgvan. A very beautiful West Australian shrub which can only be grown in the open in England in the warmest districts. Its flowers are borne in dense heads and have very long bright reddish-orange stamens. The dark green leaves are very small and rigid.

To *Erica vagans* ' Mrs. D. F. Maxwell ' (votes unanimous), from Messrs. Maxwell & Beale, Broadstone. A very pretty bright rose-pink form of *E. vagans* collected near St. Keverne, Cornwall.

To *Melictytus ramiflorus* (votes unanimous), from Rev. A. T. Boscawen, Ludgvan. A pretty berried shrub from New Zealand, where it is abundant throughout the land at an elevation of 3,000 feet. Its leaves, which are often eaten by cattle, are alternate, oblong lanceolate, serrate, thinly coriaceous, dark green above and paler beneath. Its inconspicuous pale yellowish-green flowers are borne in axillary clusters and are followed by very attractive small violet-blue berries.

To *Pentas parviflora* (votes 8 for), from W. Van de Weyer, Esq., Dorchester. A tender greenhouse shrub from the uplands of British East Africa (5,000 feet). The small long-tubed carmine flowers open out into five corolla lobes at the top. The light green leaves are lanceolate in shape.

To *Schizandra rubriflora* (votes 8 for), from Hon. Vicary Gibbs, Elstree. A deciduous climber belonging to the Magnoliaceae. It was discovered by Mr. E. H. Wilson in Western Szechuan during May, June, and September 1908, and again during September and October 1918. Its leaves are obovate to oblong-obovate in shape and the dark red flowers borne in axillary racemes are about 1 inch across. The 3-inch long, pendulous bunches of bright coral-red berries are very attractive.

To *Veronica Armstrongii* (votes 6 for), from Mr. A. Perry, Enfield. A handsome, low-growing, much-branched species from New Zealand. It grows from 1 to 3 feet high and has minute leaves closely adpressed to the stems. The whitish sessile flowers are borne in terminal 3- to 8-flowered heads.

#### Other Exhibits.

Lady Aberconway and Hon. H. D. McLaren, Tal-y-Cafn : *Primula burmanica*.  
 Mr. G. H. Dalrymple, Bartley : *Eulalia saccharifer aurea*.  
 Mr. W. Wells, jun., Merstham : *Liatris scariosa alba*.

FLORAL COMMITTEE, SEPTEMBER 29, 1925.

*Section A.*

Mr. H. B. MAY, V.M.H., in the Chair, and seven other members present.

There were no exhibits before the Committee on this occasion.

The awards recommended to Dahlias on trial at Wisley were confirmed.  
For descriptions see R.H.S. JOURNAL, vol. 51, p. 138.

*Section B.*

Mr. C. T. MUSGRAVE in the Chair, and four other members present.

**Award Recommended :—***Award of Merit.*

To *Potentilla arbuscula* (votes 4 for), from C. T. Musgrave, Esq., Godalming. A widely distributed Himalayan species of dwarf trailing habit. It is much branched and its leaves are pinnate with five small ovate-lanceolate dark green hairy leaflets. The lanceolate-obtuse stipules are brown and membranous. The bright golden-yellow flowers are very freely produced.

FLORAL COMMITTEE, OCTOBER 6, 1925.

*Section A.*

Mr. H. B. MAY, V.M.H., in the Chair, and eighteen other members present.

**Awards Recommended :—***Silver-gilt Banksian Medal.*

To Messrs. Cheal, Crawley, for Dahlias.  
To Mr. J. W. Forsyth, Putteridge, for Chrysanthemums.  
To Mr. E. J. Hicks, Twyford, for Roses.  
To Mr. H. J. Jones, Lewisham, for Asters.  
To Messrs. Luxford, Harlow, for Chrysanthemums.  
To Mr. G. Prince, Oxford, for Roses.  
To Mr. J. B. Riding, Chingford, for Dahlias.

*Silver Banksian Medal.*

To Messrs. S. Low, Bush Hill Park, for Carnations.  
To Mr. J. H. Pemberton, Havering, for Roses.  
To Mr. C. Turner, Slough, for Dahlias.  
To Messrs. Waterer, Sons & Crisp, Twyford, for Asters.  
To Mr. W. Wells, jun., Merstham, for Asters.

*Bronze Banksian Medal.*

To Misses Allen-Brown, Henfield, for Violets.  
To Messrs. Allwood, Haywards Heath, for Carnations.  
To Mr. E. Ballard, Colwall, for Asters.  
To Messrs. Barr, Taplow, for Asters.  
To Mr. T. Bones, Cheshunt, for Asters.  
To Messrs. B. R. Cant, Colchester, for Roses.  
To Messrs. Chaplin, Waltham Cross, for Roses.  
To Messrs. Cutbush, Barnet, for Dahlias.  
To Messrs. Dobbie, Edinburgh, for Gladioli.  
To Messrs. Easlea, Leigh-on-Sea, for Roses.  
To Messrs. Engelmann, Saffron Walden, for Carnations.  
To Messrs. Harkness, Hitchin, for Roses.  
To Messrs. Ladhams, Southampton, for hardy plants.  
To Mr. H. Marcham, Borough Green, for hardy plants.  
To Messrs. Prior, Colchester, for Roses.  
To Messrs. Rich, Bath, for hardy plants.  
To Mr. J. T. West, Brentwood, for Dahlias.  
To Mr. F. G. Wood, Ashted, for Asters.  
To Mr. Yandell, Maidenhead, for Chrysanthemums.

*Award of Merit.*

To Chrysanthemum 'Cranford Cream' (votes unanimous), from Mr. W. Roots, Cranford. A creamy-yellow early flowering variety of medium size. It is excellent for cutting in sprays.

To Chrysanthemum 'Enchantress' (votes unanimous) (early flowering), from Mr. T. Bones, Cheshunt. A very pleasing sport from 'Perle Rose,' producing useful sprays of flowers which are seen to great advantage under artificial light.

The following Dahlias were selected by the Joint Committee for trial at Wisley :—

From Messrs. Burrell, Cambridge :

'Diophen,' 'Elite,' 'Gloria,' 'Myra,' 'Olwen' (all Charm Dahlias).

From Messrs. Cheal, Crawley :

'Mrs. A. R. Mountain' (Dec.).

From Messrs. Stredwick, St. Leonards :

'Rose' (Coll.), 'Sentinel' (Dec.), 'Tally Ho' (Dec.), 'White Friar' (Dec.).

**Other Exhibits.**

Mr. T. Carlile, Twyford : hardy plants.

Mr. A. Edwards, Fordham : Gladioli.

N. A. Heywood, Esq., Wickham Market : Carnations.

Mr. J. J. Kettle, Corfe Mullen : Violets.

Orpington Nursery Co., Orpington : Asters.

Mr. A. Perry, Enfield : hardy plants.

Mr. B. Pinney, Tonbridge : Violets.

Messrs. Prichard, Christchurch : hardy plants.

Messrs. Russell, Richmond : Adiantum 'J. Bier.'

Mr. H. Shoesmith, jun., Mayford : Chrysanthemums.

Major Stobart, Wellington : Antirrhinum 'Mrs. Stobart.'

Mr. H. Woolman, Birmingham : Chrysanthemums.

*Section B.*

Mr. C. T. MUSGRAVE in the Chair, and thirteen other members present.

**Awards Recommended :—**

*Silver Banksian Medal.*

To Messrs. Cheal, Crawley, for shrubs.

To Messrs. Waterer, Sons & Crisp, Twyford, for shrubs.

*Bronze Banksian Medal.*

To Messrs. Maxwell & Beale, Broadstone, for alpiners.

*Award of Merit.*

To *Liatris scariosa alba* (votes 7 for, 2 against), from Mr. A. Perry, Enfield. The white form of this useful North American hardy perennial. The plant grows about 2 feet high and has long narrow entire leaves.

To *Naegelia* 'Walmsgate Beauty' (votes unanimous), from the Royal Botanic Gardens, Kew. A beautiful warm greenhouse plant belonging to the Gesneraceae. Its very attractive rosy-red flowers suffused with pink are very freely produced on dark reddish stems. The beautiful red-veined leaves are thickly covered with dark crimson hairs.

**Other Exhibits.**

Cambridge Botanic Garden : *Hymenanthera crassifolia*, F.C.C. 1892.

Misses Hopkins, Shepperton : alpiners.

Mr. Klinkert, Richmond : clipped Box trees.

Mrs. Philip Martineau, Ascot : wild Chilian Salvia.

Messrs. Prichard, Christchurch : *Eriogonum Wrightii*.

Messrs. L. R. Russell, Richmond : *Asparagus falcatus*.

G. H. Shakerley-Ackers, Esq., Uckfield : *Phytolacca decandra*.

FLORAL COMMITTEE, OCTOBER 20, 1925.

## Section A.

Mr. H. B. MAY, V.M.H., in the Chair, and seventeen other members present.

## Awards Recommended :—

*Silver-gilt Banksian Medal.*

- To Messrs. A. Dickson, Newtownards, for Roses.
- To Mr. G. Prince, Oxford, for Roses.
- To Messrs. L. R. Russell, Richmond, for foliage plants.

*Silver Banksian Medal.*

- To Messrs. Baker, Codsall, for hardy plants.
- To Messrs. Barr, Taplow, for Nerines.
- To Mr. C. Engelmann, Saffron Walden, for Carnations.
- To Messrs. Godfrey, Exmouth, for Chrysanthemums.
- To Mr. H. J. Jones, Lewisham, for Asters.
- To Messrs. Ladhams, Southampton, for hardy plants.
- To Mrs. Howard Palmer, Wokingham, for Gesnerias.
- To Mr. J. H. Pemberton, Havering, for Roses.
- To the Duchess of Wellington, Basingstoke, for *Nerine Bowdenii*, etc.

*Bronze Banksian Medal.*

- To Messrs. Allwood, Haywards Heath, for Carnations.
- To Mr. J. W. Forsyth, Putteridge, for Delphiniums.
- To Messrs. House, Westbury-on-Trym, for Scabious.
- To Messrs. Luxford, Harlow, for Chrysanthemums.
- To Mr. W. Wells, jun., Merstham, for Chrysanthemums.

*Award of Merit.*

To Chrysanthemum 'James Baxter' (votes 11 for, 1 against), from Mr. W. Baxter, Lockerley Hall Gardens, Romsey. A large very dark crimson carmine Japanese exhibition variety with long, broad florets and a pretty silver reverse.

To Chrysanthemum 'Mayford Yellow' (votes unanimous), from Mr. H. Shoesmith, jun., Woking. A deep yellow decorative Japanese variety of good useful size and excellent form.

The awards recommended to Michaelmas Daisies on trial at Wisley were confirmed. For descriptions see R.H.S. JOURNAL, vol. 51, p. 101.

## Other Exhibits.

- Mr. T. Bones, Cheslunt : Chrysanthemum 'Autumn Glow.'
- Mr. G. Carpenter, Byfleet : Chrysanthemums.
- Hon. Vicary Gibbs, Elstree : Michaelmas Daisies.
- Mr. W. Grigg, Broadstairs : *Tagetes erecta fistulosa*.
- Misses Hopkins, Shepperton : hardy plants.
- Mr. J. J. Kettle, Corfe Mullen : Violets.
- Mr. B. Pinney, Shipbourne : Violets.
- Messrs. Reanisbottom, West Drayton : Anemones.
- Mr. W. Saunders, Lustleigh : Chrysanthemums.
- Mr. W. H. Walters, Colesborne : Nerine 'Miss Judith Elwes.'
- Mr. Yandell, Maidenhead : Chrysanthemums.
- G. Yeld, Esq., Gerrard's Cross : Michaelmas Daisies.

## Section B.

Mr. C. T. MUSGRAVE in the Chair, and fifteen other members present.

## Awards Recommended :—

*Silver Banksian Medal.*

- To Mr. G. Reuthe, Keston, for shrubs.

*Bronze Banksian Medal.*

To Messrs. Waterer, Sons & Crisp, Twyford, for shrubs.  
To Mr. F. G. Wood, Ashted, for rock garden shrubs.

*Award of Merit.*

To *Arbutus Unedo* var. *rubra* (votes 12 for, 1 against), from Messrs. Gill, Falmouth. This beautiful form of the Strawberry tree has large rosy-red urceolate flowers borne on reddish stems.

To *Berberis Jamesiana* (votes unanimous), from the R.H.S. Gardens, Wisley. This beautiful fruiting shrub was discovered by Mr. G. Forrest during his 1916 expedition to Western China. The young stems are erect and of a rosy-purple shade covered with bloom and later becoming brown. The oval leaves ( $\frac{3}{4}$  to  $1\frac{1}{2}$  inches long), generally tinted with red or purple shades, have sharply pointed tips and margins often entire but sometimes toothed. The small pale yellow flowers are borne in stalked bunches and open in June. They are followed by the very beautiful and distinct round coral-red currant-like berries which are most attractive in the early autumn, and remarkable both by the early date on which they become coloured and by their translucence.

To *Bomarea Mathewsii* (votes unanimous), from E. Matthews, Esq., Director of Parks, Glasgow. A beautiful greenhouse twining plant, resulting from a cross between *B. Carderi* and *B. edulis*, made by Mr. G. H. Banks of the Botanic Gardens, Glasgow. The Alstroemeria-like flowers are borne in pendulous umbels of about 30. The outer segments are salmon-pink and the inner cream, spotted with very dark crimson. Each individual flower is borne on a stem about 8 inches long. The leaves are large, broad and lanceolate (fig. 83).

To *Bomarea Whittonii* (votes unanimous), from E. Matthews, Esq., Director of Parks, Glasgow. This is also a hybrid between *B. edulis* and *B. Carderi*. It produces umbels of about 15 large open conspicuous flowers, which are brighter and broader than those of *B. Mathewsii*. They are borne on much shorter stems. The outer segments are pale pink and the inner cream, spotted with very dark crimson—a very pretty colour combination. The pale green leaves are small, narrow and lanceolate (fig. 84).

To *Colletia spinosa rosea* (votes 13 for, 1 against), from Messrs. R. Veitch, Exeter. This rosy-pink form is a seedling from *C. spinosa*. It is a very interesting shrub with masses of tiny blooms.

To *Myrtus Ugni* (votes 9 for), from Mr. G. Reuthe, Keston. A Chilean evergreen shrub with small leathery ovate leaves about  $\frac{1}{2}$  inch long. It bears blue-black juicy berries and was on this occasion shown in fruit.

To *Viburnum theiferum* (votes unanimous), from Mr. G. Reuthe, Keston. A Chinese species producing long arching sprays bearing very freely large bunches of bright scarlet oval berries. The dark green leaves are ovate, rounded at the base and sharply toothed.

*Cultural Commendation.*

To Major Albert Pam, Broxbourne, for *Sternbergia macrantha*.

**Other Exhibits.**

Misses Hopkins, Shepperton : rock garden.

Mr. Klinkert, Richmond : clipped Box trees.

E. Matthews, Esq., Glasgow : bigeneric hybrid (*Achimenes grandiflora*  $\times$  *Gesnera zebrina*) passed to Scientific Committee with recommendation for Botanical Certificate (fig. 85).

C. T. Musgrave, Esq., Godalming : *Osmanthus armatus*.

FLORAL COMMITTEE, NOVEMBER 3, 1925.

*Section A.*

Mr. H. B. MAY, V.M.H., in the Chair, and eighteen other members present.

**Awards Recommended :—**

*Silver Banksian Medal.*

To Messrs. A. Dickson, Newtownards, for Roses.

To Messrs. Godfrey, Exmouth, for Chrysanthemums.

To Messrs. S. Low, Bush Hill Park, for Carnations.

To Messrs. Luxford, Harlow, for Chrysanthemums.

To Mr. J. H. Pemberton, Havering, for Roses.



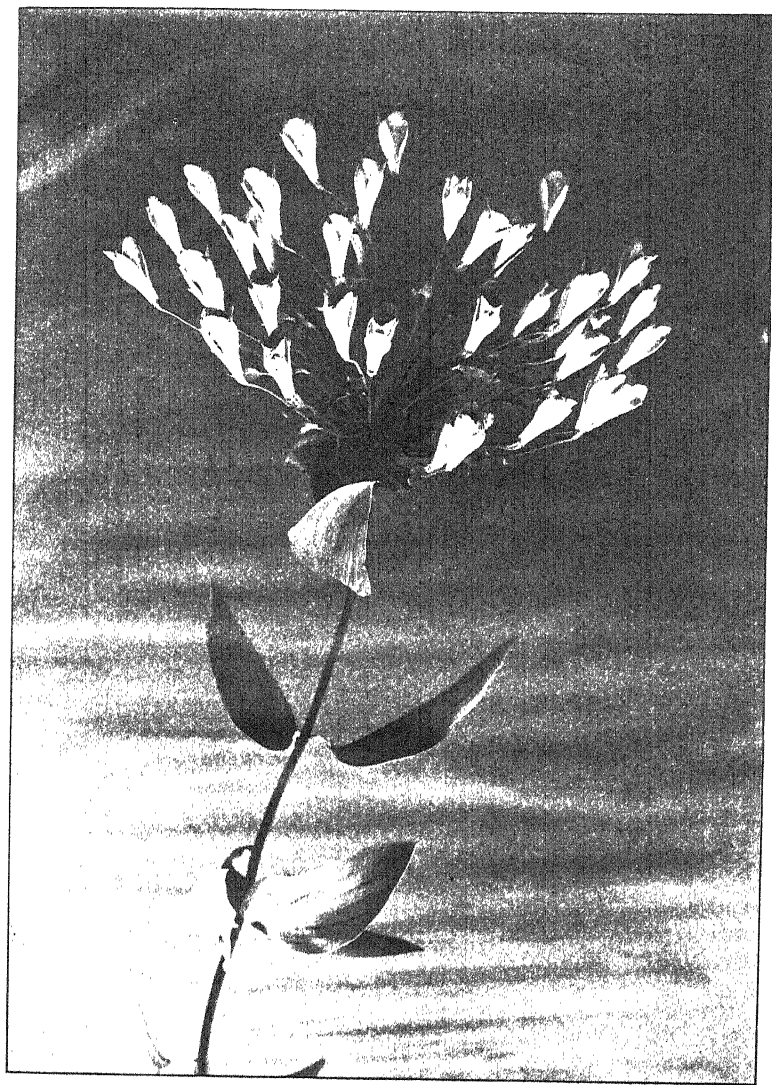


FIG. 83.—*BOMAREA* × *MATTHEWSII*.

[To face p. cxxiv.





FIG. 84.---BOMAREA  $\times$  WHITTONII.



FIG. 85.—*ACHIMENES GRANDIFLORA* × *GESNERA ZEBRINA*.

[To face p. CXXV.]

*Bronze Banksian Medal.*

- To Messrs. Allwood, Haywards Heath, for Carnations.  
 To Messrs. Engelmann, Saffron Walden, for Carnations.  
 To Mr. J. J. Kettle, Corfe Mullen, for Violets.  
 To Mr. Yandell, Maidenhead, for Chrysanthemums.

*Award of Merit.*

- To Chrysanthemum 'Mary Godfrey' (votes unanimous), from Messrs. Godfrey, Exmouth. A pale pink single variety with a very full cream centre.  
 To Chrysanthemum 'Mrs. R. F. Felton' (votes unanimous), from Messrs. Cragg, Harrison & Cragg, Heston. An excellent crimson market variety with an old gold reverse just showing at the tips in the centre.  
 To Chrysanthemum 'Ondine' (votes 11 for), from Messrs. Luxford, Harlow. A large white incurved variety slightly tinged with green at the tips.

**Other Exhibits.**

- Lord Hillingdon, Stony Stratford : Carnation 'Marygold.'  
 Misses Hopkins, Shepperton : hardy plants.  
 Mrs. Lewis, Putney : Chrysanthemums.  
 Mr. L. Shearman, Tankerton-on-Sea : Chrysanthemum 'Nellie Sanderson.'  
 Mr. H. Shoesmith, jun., Mayford : Chrysanthemums.  
 Mr. C. Turner, Slough : Dahlias.  
 Mr. W. Varian, Stamford Hill : Chrysanthemum 'Miss Nance.'

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*Section B.*

Mr. C. T. MUSGRAVE in the Chair, and sixteen other members present.

**Awards Recommended :—***Gold Medal.*

- To Hon. Vicary Gibbs, Elstree, for berried shrubs.

*Silver-gilt Banksian Medal.*

- To Messrs. C. Elliott, Stevenage, for alpiners in pans and shrubs.  
 To Mr. G. Reuthe, Keston, for conifers, etc.

*Silver Banksian Medal.*

- To Messrs. Waterer, Sons & Crisp, Twyford, for shrubs.

*Bronze Banksian Medal.*

- To Messrs. Russell, Richmond, for shrubs and climbers.

*Award of Merit.*

To *Acacia retinoides* (votes 11 for, 1 against), from Mrs. Charles Williams, Churston Ferrers. This beautiful shrub has sweetly scented bright sulphur-yellow flowers and narrow leaves 3 to 4 inches long. It will grow in the open in Devonshire and other favoured districts and its flowering season extends from November to April.

**Other Exhibits.**

- G. P. Baker, Esq., Bexley : *Helleborus corsicus*.  
 Mr. Klinkert, Richmond : clipped Box trees.  
 W. Van de Weyer, Esq., Dorchester : *Begonia Olivi* (R. *Martiana grandiflora* × *B. tuberosa*), *Pentas Ainsworthii* from Kenya Colony.

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FLORAL COMMITTEE, NOVEMBER 17, 1925.*Section A.*

Mr. H. B. MAY, V.M.H., in the Chair, and fifteen other members present.

**Awards Recommended :—***Silver-gilt Banksian Medal.*

- To Mr. H. J. Jones, Lewisham, for Chrysanthemums.  
 To Messrs. Peed, West Norwood, for Begonias.

*Silver Banksian Medal.*

To Messrs. Engelmann, Saffron Walden, for Carnations.

To Messrs. S. Low, Bush Hill Park, for Carnations and other greenhouse plants.

To Messrs. Luxford, Harlow, for Chrysanthemums.

To Mr. A. G. Vinten, Balcombe, for Chrysanthemums.

*Bronze Banksian Medal.*

To Messrs. Allwood, Haywards Heath, for Carnations.

*Award of Merit.*

To Chrysanthemum 'Clio' (votes 12 for), from Mr. H. Shoesmith, jun., Mayford. A very useful light reddish-bronze Decorative variety well adapted for market work. It has an old gold reverse.

To Chrysanthemum 'Crimson Dawn' (votes unanimous), from Mr. J. Shoebridge, East Grinstead. A deep rich crimson Single variety with several rows of florets.

To Chrysanthemum 'Enton Beauty' (votes 9 for, 2 against), from Mr. W. Hall, Witley. A very dark velvety crimson Decorative variety with a reddish-bronze reverse. This is one of the darkest varieties exhibited during recent years.

**Other Exhibits.**

Mr. G. Carpenter, Byfleet : Chrysanthemums.

Mrs. Mansel-Jones, Stockbridge : Chrysanthemum 'Bossington Rose.'

Messrs. Reamsbottom, West Drayton : Anemones.

Mr. L. Shearman, Tankerton-on-Sea : Chrysanthemums.

Mr. H. Tanner, Hurstpierpoint : Chrysanthemum 'Mrs. Simmance.'

Mr. J. Watkinson, Amhurst Park : Chrysanthemum 'Mrs. J. Watkinson.'

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*Section B.*

Mr. C. T. MUSGRAVE in the Chair, and eleven other members present.

**Awards Recommended :—**

*Bronze Banksian Medal.*

To Messrs. Russell, Richmond, for shrubs.

*Award of Merit.*

To *Galanthus byzantinus* 'November' (votes unanimous), from C. T. Musgrave, Esq., Godalming. This beautiful Snowdrop is identical, except in time of flowering, with the *G. byzantinus* for which the same exhibitor obtained an Award of Merit on February 10, 1925. The plants exhibited on the present occasion were lifted from the open ground on the previous day, and the early flowering habit of this variety has been quite consistent for at least ten years.

To *Leonotis Leonurus*, the Warren variety (votes unanimous), from E. M. Preston, Esq., Hayes. A very beautiful cool greenhouse shrubby plant with whorls of bright orange-red labiate flowers and narrow lanceolate serrate leaves about 2 to 3 inches long. It is quite an improvement on the type and the seeds from which it was raised came from California.

*Cultural Commendation.*

To C. R. Scrase-Dickens, Esq., Horsham, for a splendid exhibit of *Helicoborus alifolius*.

**Other Exhibits.**

Hon. R. James, Richmond, Yorks : *Prinsepia sinensis*.

Mr. Klinkert, Richmond, Surrey : clipped Box trees.

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FLORAL COMMITTEE, DECEMBER 1, 1925.

*Section A.*

Mr. H. B. MAY, V.M.H., in the Chair, and sixteen other members present.

**Awards Recommended :—**

*Silver-gilt Banksian Medal.*

To Messrs. Engelmann, Saffron Walden, for Carnations.

To Messrs. Luxford, Harlow, for Chrysanthemums.

To Baron Bruno Schröder, Englefield Green, for Begonias.

*Silver Banksian Medal.*

- To Messrs. Allwood, Haywards Heath, for Carnations.  
 To Messrs. S. Low, Bush Hill Park, for Carnations.  
 To Messrs. Russell, Richmond, for palms, tree ferns, etc.  
 To Mr. A. G. Vinten, Balcombe, for Chrysanthemums.  
 To Messrs. Wallace, Eaton Bray, for Carnations.

*Bronze Banksian Medal.*

- To S. J. Hose, Esq., Betchworth, for Carnations.  
 To Messrs. Sutton, Reading, for seedling Chrysanthemums.

*Award of Merit.*

To *Asparagus plumosus Boundii* (votes unanimous), from Messrs. Bound, Redhill. This variety is much more plumose and of a paler green than the type. It forms a very useful addition to these valuable greenhouse Decorative plants.

To Chrysanthemum 'Belle Chinoise' (votes unanimous), from Messrs. Luxford, Harlow. A deep golden-yellow Japanese variety of excellent form and medium size. It was raised by Mr. T. W. Pockett in Australia.

To Chrysanthemum 'Delicata' (votes unanimous), from Mr. H. Shoesmith, jun., Mayford. A Decorative variety of nice shape and good form. Its colour is a very pleasing pale blush pink.

To Chrysanthemum 'Pink Prize' (votes unanimous), from Mr. H. W. Thorp, Durrington. A good deep pink Decorative sport from 'The Favourite.'

To Chrysanthemum 'Ruby Ray' (votes unanimous), from Mr. H. W. Thorp, Durrington. A medium-sized dark crimson Single with a golden eye. It is the result of a cross between 'Sandown Radiance' and 'Lady Astor, M.P.'

**Other Exhibits.**

- Messrs. Busby, Buckingham : Chrysanthemum 'Golden Tinsel.'  
 Mr. M. C. Cannon, Surbiton : Chrysanthemum 'Mrs. M. C. Cannon.'  
 Mr. G. Carpenter, Byfleet : Carnation 'Mrs. C. E. Ridge.'  
 Messrs. Reamsbottom, West Drayton : Anemones.  
 Mr. W. H. Smith, Chichester : Carnation 'Marjorie Smith.'

*Section B.*

Mr. C. T. MUSGRAVE in the Chair, and thirteen other members present.

**Awards Recommended :—***Bronze Banksian Medal.*

- To Miss G. Howse, Golders Green, for miniature gardens.  
 To Mr. G. G. Whitelegg, Chislehurst, for shrubs and alpinists.

*Award of Merit.*

To *Pavetta abyssinica* (votes 10 for), from Royal Botanic Gardens, Kew. This interesting member of the Rubiaceae comes from East Tropical Africa, where it grows on the lower slopes of the mountains. It is a shrub with thin dark green obovate elliptic leaves, bluntly acuminate. The four white segments of the corolla terminate a narrow tube about  $\frac{1}{2}$  inch long. The green anthers are slightly exserted, and the very conspicuous style is much longer than the flower. The flowers are borne in large heads.

**Other Exhibits.**

- Misses Hopkins, Shepperton : pavement garden.  
 Mr. Klinkert, Richmond : clipped Box trees.

FLORAL COMMITTEE, DECEMBER 15, 1925.

*Section A.*

Mr. H. B. MAY, V.M.II., in the Chair, and thirteen other members present.

**Awards Recommended :—***Silver Banksian Medal.*

- To Messrs. Engelmann, Saffron Walden, for Carnations.  
 To Messrs. S. Low, Bush Hill Park, for Carnations.  
 To Mr. A. G. Vinten, Balcombe, for Chrysanthemums.

*Bronze Banksian Medal.*

To Lady Mond, Romsey, for *Gesnera* hybrids.  
To Messrs. Russell, Richmond, for foliage plants.  
To Mr. A. Sharnbrook, Aylesbury, for *Cyclamen*.

*Award of Merit.*

To Carnation 'Mary Pearson' (votes unanimous), from Messrs. S. Low, Bush Hill Park. A violet-mauve variety with traces of cerise at the base of the petals. It was given an award mainly on account of its very pronounced scent, which is a great asset at this season of the year.

To Carnation 'Sir Alfred Mond' (votes 8 for), from Lady Mond, D.B.E., Romsey. A large dark crimson variety useful for exhibition. It is the result of a cross between 'Carola' and 'Violet Mond.'

To Chrysanthemum 'Bianca' (votes unanimous), from Messrs. Cragg, Harrison & Cragg, Heston. A coppery-red Decorative variety with a pale gold reverse.

To Chrysanthemum 'Omega' (votes unanimous), from Mr. H. Shoesmith, jun., Mayford. A nice golden-bronze Decorative variety of medium size.

To Chrysanthemum 'Phryne' (votes unanimous), from Messrs. Cragg, Harrison & Cragg, Heston. A useful pale pink medium-sized Decorative variety.

To Chrysanthemum 'Zenith' (votes unanimous), from Messrs. Luxford, Sawbridgeworth. A bright fiery-orange Single variety with a narrow bright yellow zone round the eye. A very striking novelty, which by reason of its brightness will be very useful for decorative work.

**Other Exhibits.**

Messrs. Allwood, Haywards Heath : Carnations.  
Mr. W. Brown, Mayfield : Chrysanthemum 'Mayfield Sunrise.'  
Messrs. Davies, Bristol : Chrysanthemums.  
Misses Hopkins, Shepperton : Tulips.  
Messrs. Marshall, Ayr : Chrysanthemum 'Yellow Favourite.'  
Mr. W. H. Page, Hampton : Carnation 'No. 1 Scarlet.'  
Messrs. Sutton, Reading : Chrysanthemums.  
Messrs. Young, Oxted : Chrysanthemum 'Sunshine Wilcox.'

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*Section B.*

Mr. C. T. MUSGRAVE in the Chair, and eleven other members present.

**Awards Recommended :—**

*Silver Banksian Medal.*

To Hon. Vicary Gibbs, Elstree, for shrubs and other plants with coloured stems.

*Bronze Banksian Medal.*

To Messrs. Wilson & Agar, Twyford, for shrubs.

*Award of Merit.*

To *Lachenalia* × *Boundii* (votes unanimous), from Messrs. Bound, Redhill. An interesting cross said to be between *L. pendula* and *L. rubida*, growing about 1 foot high, with broad dark green leaves curling at the tips. The very attractive scarlet tubular flowers, about 1 inch long, tipped with purple and green, are borne in a bold spike on a stem spotted with dark crimson.

**Other Exhibits.**

Miss G. Howse, Golders Green : miniature gardens.  
Mr. Klinkert, Richmond : clipped Box trees.  
Messrs. Maxwell & Beale, Broadstone : rock garden.  
Mr. F. G. Wood, Ashted : miniature gardens.



## ORCHID COMMITTEE.

JULY 14, 1925.

Sir JEREMIAH COLMAN, Bt., in the Chair, and eleven other members present.

**Awards Recommended :—***Silver-gilt Banksian Medal.*

To J. J. Bolton, Esq., Claygate Lodge, Claygate, Surrey (gr. Mr. S. Lyne), for *Odontoglossums* and *Odontiodas*.

To H. T. Pitt, Esq., Rosslyn, Stamford Hill, N. (gr. Mr. Thurgood), for species and hybrids.

To Messrs. Sanders, St. Albans, for various Orchids.

*Award of Merit.*

To *Diplomeris hirsuta* (votes 7 for), from Messrs. Sanders. A pretty species from Sikkim, terrestrial in habit, with a globose tuber, and of short stature. Flower white, about an inch and a half across, the long spur funnel-shaped at the mouth, otherwise cylindric.

*Cultural Commendation.*

To Mr. F. W. Thurgood, Orchid grower to H. T. Pitt, Esq., for *Platyclinis filiformis*, of which four specimens were shown, the best having 31 spikes of minute golden coloured flowers.

To Mr. F. W. Thurgood for *Odontioda* × 'Thiasa' var. 'Golden Goddess,' with a spike of 32 flowers.

To Mr. S. Lyne, Orchid grower to J. J. Bolton, Esq., for *Brassolaeliocattleya* × 'Jupiter' var. 'Mrs. Stewart,' a robust plant bearing four large flowers.

**Other Exhibit.**

Messrs. Flory & Black, Slough : various *Miltonia* hybrids and *Brassocattleya* 'Elia' (C. × 'Jasper' × B-c. × 'Ilene').

ORCHID COMMITTEE, JULY 28, 1925.

FREDERICK J. HANBURY, Esq., in the Chair, and nine other members present.

**Awards Recommended :—***Silver Banksian Medal.*

To H. T. Pitt, Esq., Rosslyn, Stamford Hill, for various Orchids.

To Messrs. Cowan, Southgate, for species and hybrids.

*Award of Merit.*

To *Sophrolaeliocattleya* × 'Magnet' (S-l-c. × 'Virginia' × C. *Hardyana*) (votes unanimous) from Lt.-Col. Sir George Holford, K.C.V.O., Westonbirt, Tetbury, Glos. The two flowers were of medium size, the segments compactly formed, of purplish mauve colour, the roundly formed labellum crisped at the margin, the front zone rich purple, the inner area velvety crimson, and with gold venation in the throat.

ORCHID COMMITTEE, AUGUST 11, 1925.

FREDERICK J. HANBURY, Esq., in the Chair, and eight other members present.

**Awards Recommended :—***Silver Banksian Medal.*

To Messrs. Sanders, St. Albans, for species and hybrids.

*Award of Merit.*

To *Brassocattleya* × 'Corrientes' (B-c. × 'Ilene' × C. *Hardyana*) (votes 6 for, 1 against), from Dr. Miguel Lacroze, Bryndir, Roehampton. The large flower is noteworthy on account of its upstanding petals and the broadly developed labellum which is crisped at the margin and fringed. Sepals and petals of uniform rosy mauve, labellum darker on the marginal zone, while each of the lateral lobes bears a bright yellow area.

**Other Exhibits.**

Messrs. Flory & Black: *Cattleya* × 'Lysander' (*triumphans* × 'Rhoda'), with yellow sepals and petals; *Cattleya* × 'Hermia' (*Warszewiczii* × 'Dionysius'); and *Cattleya* × 'Helena' (*Kienastiana* × 'Maggie Raphael').

Baron Bruno Schröder: *Brassolaeliocattleya* × 'Flavida' (*B-l-c.* 'Amber' × *L-c.* 'Golden Queen'), entirely yellow, the labellum shaded delicate peach.

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ORCHID COMMITTEE, AUGUST 25, 1925.

C. J. LUCAS, Esq., in the Chair, and nine other members present.

**Awards Recommended :—**

*Award of Merit.*

To *Brassolaeliocattleya* × 'Golden Glory' (*B-c.* 'Mrs. J. Leeman' × *L-c.* 'Orion'), (votes unanimous), from C. J. Lucas, Esq., Warnham Court, Horsham. The well-cultivated plant bore a couple of large flowers having clear yellow sepals and petals, the expansive labellum crisped and fringed at the margin, the outer zone of bright rose, the central area yellowish with crimson suffusion.

To *Odontoglossum* × 'Laurentia' *magnificum* ('Jasper' × 'Olympia') (votes unanimous) from J. J. Bolton, Esq., Claygate, Surrey. The arching spike bore ten flowers of thick texture, the sepals and petals rose tinted and blotched with red; the large labellum broadest at its apex, white, and with a bright red blotch on the central area.

**Other Exhibits.**

J. J. Bolton, Esq.: *Odontoglossum* × 'Harold,' with a spike of eight large flowers.

Messrs. Sanders: *Cattleya* × 'Surprise,' with the sepals and petals suffused with deep rosy-mauve, the former showing some whitish mottling, and the latter veined with white over the whole area. A very distinct flower.

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ORCHID COMMITTEE, SEPTEMBER 8, 1925.

Sir JEREMIAH COLMAN, Bt., in the Chair, and twelve other members present.

**Awards Recommended :—**

*Silver-gilt Banksian Medal.*

To H. T. Pitt, Esq., Rosslyn, Stamford Hill, for various Orchids.

To Messrs. Sanders, St. Albans, for species and hybrids.

*Silver Banksian Medal.*

To Messrs. Stuart Low, Jarvisbrook, Sussex, for various Orchids.

*Award of Merit.*

To *Odontoglossum* × 'Enchantress' ('Anzac' × 'Colossus'), from Ernest R. Ashton, Esq., Broadlands, Camden Park, Tunbridge Wells (votes 10 for). This hybrid bore a spike of eleven flowers, the segments broadly developed, rose tinted and blotched with reddish-purple, the labellum white with a red-brown blotch on the central area.

To *Laeliocattleya* × 'Senator' var. 'Titanic' (votes unanimous) from Messrs. Flory & Black, Slough. A large flower of fine construction. Sepals and petals rosy-mauve, the latter slightly crisped on the apical margin, the expansive labellum having the front portion covered with a rich velvety crimson colour, while each of the side lobes bears a yellowish disc derived from *Cattleya Warszewiczii*.

**Other Exhibits.**

Leonard Dixon, Esq., Willoughthorpe, Stanstead Abbots: *Cattleya* × 'Thebes' var. 'L. Dixon,' a large flower of bronze-buff tints, with the labellum crimson.

Baron Bruno Schröder: *Brassolaeliocattleya* × 'Irma,' of clear canary-yellow colour, and *B-l-c.* × 'Salta.'

Messrs. Flory & Black: *Laeliocattleya* × 'Strathmore,' a roundly formed flower of rosy-mauve colour, and *Cattleya* × 'Lysander' var. 'Mimosa,' yellow, except for the ruby lip.

ORCHID COMMITTEE, SEPTEMBER 22, 1925.

Sir JEREMIAH COLMAN, Bt., in the Chair, and thirteen other members present.

**Awards Recommended :—**

*Silver-gilt Flora Medal.*

To Messrs. Stuart Low, Jarvisbrook, Sussex, for various species and hybrids.

*Silver Flora Medal.*

To Messrs. Cowan, Southgate, for hybrids.

To Messrs. Flory & Black, for Cattleyas.

*Award of Merit.*

To *Cattleya* × '*Mimosa*' *superba*, from Messrs. Cowan (votes 9 for). An attractive hybrid with the sepals and broad petals of bright golden yellow colour, the labellum much expanded at the apex, crisped at the margin, and light crimson in colour; the comparatively small lateral lobes envelop the whitish column.

To *Cattleya* × '*Tagus*' var. '*King George*,' from Messrs. Flory & Black (votes 11 for). This distinct hybrid has the sepals and petals of bright lemon-yellow colour, the labellum intense crimson-purple, the middle area of the throat being obscurely veined.

To *Cattleya* × *amabilis alba*, Low's var., from Messrs. Stuart Low, Jarvisbrook, Sussex (votes 10 for). A large flower with the sepals and petals prettily formed and pure white, the labellum with the front bright purple, margined white.

To *Laeliocattleya* × '*Profusion*' var. '*Adriatic*,' from Messrs. McBean, Cooksbridge, Sussex (votes 8 for). A fine example of this free-flowering hybrid. The spike bore four flowers of rosy-mauve colour, the lip purplish and with a cream-coloured area on each lateral lobe.

*Cultural Commendation.*

To Mr. F. C. Puddle (gr. to Lady Aberconway and the Hon. H. D. McLaren), Bodnant, Tal-y-Cafn (votes 9 for, 4 against), for a finely cultivated *Cypripedium Fairrieanum*, imported five years previously, the flowers larger than the type.

ORCHID COMMITTEE, OCTOBER 6, 1925.

Sir JEREMIAH COLMAN, Bt., in the Chair, and fourteen other members present.

**Awards Recommended :—**

*Silver Banksian Medal.*

To Messrs. Sanders, for species and hybrids.

To Messrs. Cowan, for Cattleya hybrids.

*First-class Certificate.*

To *Laeliocattleya* × '*Queen Mary*' var. *fulgens* (*L.-c.* '*Lustre*' × *C. Peetersii*), (votes 9 for, 3 against), from Lt.-Col. Sir George Holford, K.C.V.O., Westonbirt, Tetbury, Glos. The spike bore three large flowers of clear rosy-mauve colour, the petals broadly developed, while the labellum, with its prettily frilled margin, is almost entirely ruby-crimson, the exception being a small yellowish area on each of the lateral lobes.

*Award of Merit.*

To *Cattleya* × '*Bellona*' var. '*St. Albans*' (*Dowiana* × '*Maggie Raphael*') (votes 9 for, 2 against), from Messrs. Sanders. A charming hybrid, cream-yellow in the sepals and petals, and dark crimson in the labellum.

To *Laeliocattleya* × '*Pandora*' (*C.* × '*Fabia*' × *L.-c.* '*Marmion*') (votes unanimous), from Messrs. Cowan. Flower of large size, of an unusual salmon-pink colour in the sepals and broad petals, the labellum ruby coloured, the side lobes each having a central area of gold and a narrow rose-coloured margin.

**Other Exhibit.**

Messrs. Flory & Black : *Cattleya* × '*Lorna*,' and other hybrids.

ORCHID COMMITTEE, OCTOBER 21, 1925.

Sir JEREMIAH COLMAN, Bt., in the Chair, and fifteen other members present.

**Awards Recommended :—**

*Gold Medal.*

To Messrs. McBean, Cooksbridge, Sussex, for various species and hybrids.

*Silver-gilt Medal.*

To Messrs. Sanders, St. Albans, for *Vanda coerulea* and *Cattleya* × 'Fabia.'

To Messrs. Charlesworth, Haywards Heath, for *Dendrobium Phalaenopsis*, and various hybrids.

To Messrs. Cowan, Southgate, for *Cattleyas*.

To J. J. Joicey, Esq., The Hill, Witley, Surrey, for species and hybrids.

To Messrs. Flory & Black, Slough, for yellow-flowering *Cattleyas*.

To Messrs. Stuart Low, Jarvisbrook, Sussex, for various species and hybrids.

*Challenge Cup* offered by members of the trade for group not exceeding 60 sq. ft.

H. T. Pitt, Esq., Rosslyn, Stamford Hill, N.

*Silver Banksian Medal.*

To Sir Jeremiah Colman, Bt., Gatton Park, Surrey, for specimen *Cattleyas*.

To Messrs. Cypher, Cheltenham, for *Cypripediums*.

To Mr. Harry Dixon, Wandsworth Common, for various Orchids.

*Award of Merit.*

To *Cattleya* × 'Mimosa' var. *grandiflora* ('Venus' × *triumphans*) (votes 15 for, 1 against), from Messrs. Cowan, Southgate, N. A remarkable hybrid of large size, the flower being thick in texture, the sepals and petals golden yellow slightly tinged with bronze, and the flatly displayed labellum plum-purple, with the small lateral lobes enveloping the column.

To *Vuystekeara* × 'Edna,' Stamperland var. (*Miltoniodes* × *Harwoodii* × *Odontioda* × *Charlesworthii*) (votes unanimous), from Robert Paterson, Esq., Cathcart, Stamperland, Glasgow. One of the best results obtained by crossing the three genera *Odontoglossum*, *Cochlidia* and *Miltonia*. The spike bore nineteen flowers and buds, the reddish-scarlet colour being evenly distributed throughout all the segments, and brighter than that of other varieties.

To *Laeliocattleya* × 'Profusion' var. 'Megantic' (*C. Hardyana* × *L.-c.* × 'Serbia') (votes unanimous), from Messrs. McBean, Cooksbridge, Sussex. A very large flower of excellent formation. Of rosy-mauve colour, the labellum much darker and with a narrow margin of rose colour, the throat obscurely marked with golden venation.

To *Cattleya* × 'Lady Veitch,' Rosslyn var. (*Lueddemanniana* × *Warneri*) (votes 13 for, 1 against), from H. T. Pitt, Esq., Rosslyn, Stamford Hill. Albino varieties of both parents were used in the production of this hybrid, hence the flower is pure white, except for slight yellow in the throat. The petals are broadly formed.

**Other Exhibits.**

A. R. Wilson-Wood, Esq., Timsbury Manor, Romsey: *Laeliocattleya* × 'Yellowstone' (*C. aurea* × *L.-c. xanthina*), with bright yellow sepals and petals, and *Cattleya* × 'Moirs,' of a pleasing rose-purple colour.

Mrs. Jervoise, Herriard Park, Basingstoke: *Laeliocattleya* × 'Beatrice de Herriard,' yellow with crimson labellum, and *Laeliocattleya* × 'Primrose de Herriard,' with attractive flowers.

ORCHID COMMITTEE, NOVEMBER 3, 1925.

Sir JEREMIAH COLMAN, Bt., in the Chair, and twelve other members present.

**Awards Recommended :—**

*Silver Banksian Medal.*

To Messrs. Sanders, St. Albans, for species and hybrids.

To Messrs. Stuart Low, Jarvisbrook, Sussex, for various Orchids.

To Messrs. McBean, Cooksbridge, Sussex, for *Cattleya* hybrids.

*Award of Merit.*

To *Sophrolaeliocattleya* × 'Lucifer' (*L.-c.* × 'Majestic' × *S.-l.-c.* × 'Anzac') votes unanimous), from Messrs. McBean, Cooksbridge, Sussex. Sepals and petals of mauve-purple, tinged with red, and having a pretty sheen, the large and roundly formed labellum crimson-purple, the throat marked with parallel whitish lines.

**Other Exhibits.**

Messrs. Black & Flory, Slough : *Brassocattleya* × 'Alderman,' of bright rose-pink colour, and *Cattleya* × 'Litta.'

Baron Bruno Schröder : flowers of *Cattleya* × 'Esther Waldegrave,' pure white, and of *Cattleya* × 'Elextion,' yellow, with crimson tinge on the lip.

## ORCHID COMMITTEE, NOVEMBER 17, 1925.

Sir JEREMIAH COLMAN, Bt., in the Chair, and sixteen other members present.

**Awards Recommended :—***Silver Banksian Medal.*

To Messrs. Cowan, Southgate, N., for *Cattleyas* and *Cypripediums*.

*Award of Merit.*

To *Cypripedium* × 'Baldur' *magnificum* ('G. F. Moore' × 'Niobe') (votes 11 for), from Lt.-Col. Sir George Holford, K.C.V.O., Westonbirt. An improvement on the well-known *Cypripedium* × 'Niobe,' having the dorsal sepal flushed with rose and effectively marked with purplish venation; the petals broadly crisped on their upper margin, stained and marked with lines of brown-purple.

To *Brassocattleya* × 'Rosita' (*C. aurea* × *B.-c.* 'Ilenc') (votes 12 for), from Messrs. Stuart Low, Jarvisbrook, Sussex. A large flower of rose-pink colour, the labellum having the central area golden yellow and the outer zone dark purple, the margin prettily fringed.

To *Cypripedium* × 'Rosalind' ('Niobe' × 'Reginald Young') (votes 10 for, 1 against), from Messrs. Sanders, St. Albans. A pretty hybrid much resembling *Cypripedium* × 'Niobe,' but of richer coloration. The dorsal sepal is almost covered with purplish dotting and venation.

**Other Exhibits.**

Sir Jeremiah Colman, Bt. : a large specimen of *Brassolaeliocattleya* × 'Antoinette,' with eight flowers of purplish-rose colour; *Cattleya* × 'Ariel,' with clusters of lilac-blue flowers, and several uncommon species.

Messrs. Flory & Black : *Laeliocattleya* × 'Rajah,' and other interesting hybrids.

Messrs. Charlesworth : *Laeliocattleya* × 'Orchus,' with sepals and petals of deep yellow, and *Vuytsteheara* × 'Rutherford's Sylvia,' with rose-coloured flowers.

Lt.-Col. Sir George Holford : cut flowers of *Sophrolaeliocattleya* × 'Nada.'

Messrs. Sanders : *Laeliocattleya* × 'Empire.'

Messrs. Stuart Low : *Laeliocattleya* × 'Nella,' and *Brassocattleya* × 'Eudora,' of rose-pink colour.

## ORCHID COMMITTEE, DECEMBER 1, 1925.

Sir JEREMIAH COLMAN, Bt., in the Chair, and fourteen other members present.

**Awards Recommended :—***Silver-gilt Banksian Medal.*

To Messrs. Cowan, Southgate, N., for various hybrids.

*Silver Banksian Medal.*

To Messrs. Sanders, St. Albans, for species and hybrids.

To Henry S. Brandt, Esq., Capenor, Nutfield, Surrey, for *Cypripediums* and *Calanthe Veitchii*.

To H. T. Pitt, Esq., Rosslyn, Stamford Hill, for species and hybrids.

To Messrs. J. Cypher, Cheltenham, for *Cypripediums*.

*Bronze Banksian Medal.*

To Mr. Harry Dixon, Wandsworth Common, for *Cypripediums* and Orchid species.

*Award of Merit.*

To *Odontoglossum* × 'Robin Hood' ('Mars' × *illustrissimum*) (votes 13 for), from R. Gerrish, Esq., Milford Manor, Salisbury. Flowers of medium size, of deep crimson-red colour, the segments having a narrow white border line.

To *Cypripedium* × 'Locarno' ('Albert Fisher' × 'Christopher' var. 'Grand Duke Nicholas') (votes 10 for), from Messrs. Flory & Black. A large flower, the dorsal sepal roundly formed, green at the base, and with light purplish spotting extending over the white upper portion; the ventral sepal of almost equal size and similarly marked.

To *Vuystekeara* × 'Lutetia' (*Vuystekeara Brewii* × *Odontoglossum luridum*) (votes 13 for), from Messrs. Charlesworth. Labellum broadly developed, crimson-red at the base, purplish on the apical half, the central area rose tinted with crimson-red spotting. Sepals and petals reddish.

**Other Exhibits.**

Baron Bruno Schröder: *Calanthe* × *Harrisii* and *Miltonia* × 'Lycæna,' with large flowers, flushed with crimson.

Sir Herbert S. Leon, Bt., Bletchley Park, Bucks: *Cattleya* × 'Esther,' with a spike of seven purplish-mauve flowers.

R. Gerrish, Esq., Milford Manor, Salisbury: *Odontoglossum* × 'Ovidius,' with roundly formed flowers.

Messrs. Keeling, Westgate Hill, Bradford: various *Cypripediums* and *Odontonia* × *Pittiae*.

Messrs. McBean, Cooksbridge: *Odontoglossum* × 'Dictune,' with a spike of ten flowers, the segments blotched with purple.

Messrs. Flory & Black: *Cattleya* × 'Sylvia' var. 'The Bride,' and several *Cypripedium* hybrids.

ORCHID COMMITTEE, DECEMBER 15, 1925.

C. J. LUCAS, Esq., in the Chair, and twelve other members present.

**Awards Recommended:—**

*Silver-gilt Banksian Medal.*

To Capt. Maldwin Drummond, Cadland Park, Southampton, for *Cypripediums*, species and hybrids being equally represented.

*Silver Banksian Medal.*

To Messrs. Sanders, St. Albans, for species and hybrids.

*Bronze Banksian Medal.*

To Messrs. Stuart Low, Jarvisbrook, Sussex, for various Orchids.

To Messrs. Cowan, Southgate, N., for *Cypripediums* and *Odontiodas*.

*Award of Merit.*

To *Scuticaria Steelei*, from Sir Herbert S. Leon, Bt., Bletchley Park, Bucks. A well-cultivated plant of this species, originally introduced from Demerara in 1836 by Matthew Steele. The cylindrical leaves are quite pendent, the flowers nearly three inches in diameter, light yellow spotted with red-brown.

To *Cypripedium* × 'The Princess' ('Alcibiades' × 'Alcimedea'), from Messrs. Armstrong & Brown, Tunbridge Wells. A large flower in which the dorsal sepal has the greater part of greenish colour with dark spotting evenly distributed.

To *Cypripedium* × 'Cardinal Mercier.' The dorsal sepal flushed with crimson-purple over two-thirds of its area. The whole flower has a glossy appearance.

**Other Exhibits.**

Messrs. Flory & Black, Slough: *Brassocattleya* × 'The Provost,' of soft crimson colour, *Laeliocattleya* × 'Yule,' with a spike of four large purple flowers, and various *Cypripediums*.

Messrs. Keeling, Westgate Hill, Bradford: several *Cypripedium* hybrids.

R. Gerrish, Esq., Milford Manor, Salisbury: *Odontoglossum crispum* var. 'Dawn,' with a spike of fourteen roundly formed flowers, also *Odontioda* × 'Warden,' of bright scarlet-red colour.

Baron Bruno Schröder: *Brassolaeliocattleya* × 'Flavida,' of light chrome-yellow colour.

Messrs. Armstrong & Brown, Tunbridge Wells: *Cypripedium* × 'T. B. Armstrong,' and *Cypripedium* × 'Warrior' var. 'H. Green.'

DONATIONS OF PLANTS, SEEDS, &c., TO THE SOCIETY'S GARDENS  
AND LABORATORY AT WISLEY DURING THE YEAR ENDING  
DECEMBER 31, 1925.

- ABBOTT, Messrs. E., Ardleigh. Sweet peas.  
ALWAY, C., Brockenhurst. *Euonymus* seed.  
AMES, V., King's Lynn. *Abies Pinsapo*.  
AMSTERDAM BOTANIC GARDEN. Miscellaneous seeds.  
ARCHER, W. B., Ashford. Roses.  
ARGOTTI BOTANIC GARDEN, Malta. Miscellaneous seeds.  
ARMSTRONG, Professor, Lewisham. Seed of *Aucuba*.  
ARNOLD ARBORETUM, Mass. *Pentstemon rupicola*.  
ASTON, B. C., Leeds. *Celmisia Mackenae*.  
ATHENS BOTANIC GARDEN. Miscellaneous seeds.  
AUTON, Mr., Pyrford. Seeds of *Eucalyptus*, Plants of *Echinops Ritro*, *Aloysia citriodora*, *Chimonanthus fragrans*.  
BACKHOUSE NURSERIES LTD., York. Irises for trial.  
BAILLIE, H., New Zealand. Seed of *Xeronema*, *Callistemon*.  
BAKER, G. P., Bexley. Miscellaneous seeds. Irises for trial.  
BAKER, H. C., Hertford. Seeds of *Taiwania cryptomerioides*, *Cunninghamia henishi*, *Cupressus formosensis*.  
BAKER, W., Oxford. Miscellaneous seeds.  
BALCOMBE, W., Malmesbury. Seed of *Ceanothus azureus Candolleanus*.  
BALFOUR, F. R. S., Dawyck. *Xerophyllum tenax*.  
BALLEGRO, J. E., Holland. Dahlias for trial.  
BALME, J., Mexico. Seed of *Cassia floribunda*.  
BARBIER, Messrs., Orleans. Plant of *Pinus sylvestris*.  
BARR, Messrs., London. Seeds of *Gentiana calycosa*, *Liliums*, *Alliums*; Potatos, Turnips, Swedes, Peas, Irises, for trial; *Roemeria hybrida*, *Viola gracilis* 'Huntercombe Purple,' New Zealand seeds; Spinach, Daffodils, for trial; Pæonies, miscellaneous plants, *Primula* seeds.  
BARTHOLOMEW, A. C., Reading. Seeds of *Oxalis oregana*, *Muscari pallens*, miscellaneous flower seeds, *Capparis rupestris*.  
BASLE BOTANIC GARDEN. Miscellaneous seeds.  
BATH LTD., Messrs. R., Wisbech. Raspberries, Black Currants.  
BECKWITH, Messrs. G., Hoddesdon. Roses.  
BENNETT, J., British Columbia, *Tiarella laciniata*, *Arbutus Menziesii*, *Lilium montanum*, miscellaneous seeds, and bulbs.  
BERLIN BOTANIC GARDEN. Miscellaneous seeds.  
BERN BOTANIC GARDEN. Miscellaneous seeds.  
BERNAIX, P., Villier Canne, Rhône. Roses for trial.  
BIRTLES, E. W., Frodsham. Sweet Pea for trial.  
BLACKETT, A. R., Leicester. Seedlings of *Callistemon* sp. from Australia.  
BOLOGNA BOTANIC GARDEN. Miscellaneous seeds.  
BONA BOTANIC GARDEN. Miscellaneous seeds.  
BOTANIC GARDEN DE LA VILLE DE METZ. Miscellaneous seeds.  
BOWDEN, W. D., Sierra Leone. Begonia.  
BOWLES, E. A., Waltham Cross. Plants collected in the Pyrenees; seeds, corms, and bulbs.  
BREMEN BOTANIC GARDEN. Miscellaneous seeds.  
BRESLAU BOTANIC GARDEN. Miscellaneous seeds.  
BRONSON, H. L., Blackheath. Dahlia for trial.  
BROOKLYN BOTANIC GARDEN, U.S.A. Miscellaneous seeds.  
BROWN, F. C., Wisley. Miscellaneous seeds.  
BROWN, J., Cirencester. Miscellaneous seeds for trial.  
BUDAPEST BOTANIC GARDEN. Miscellaneous seeds.  
BULLAR, Mrs., Guernsey. Seeds of *Leptospermum* sp., *Clanthus*.  
BULLEY, N. K., Neston. *Pieris Forrestii*, *Pulmonaria* sp.  
BUNYARD, G., Maidstone. Irises for trial.  
BURPEE, Messrs., Philadelphia, U.S.A. Sweet Peas, Spinach, Hybrid Poppies, for trial.  
BURRELL, Messrs. J., Cambridge. Dahlias for trial.  
BURTT DAVY, J., Oxford. Miscellaneous seeds.  
BUTTON, C., Upminster. Miscellaneous flower seeds.  
CALDWELL, V., Reigate. Seeds from Argentine.

- CAMBRIDGE BOTANIC GARDEN. Miscellaneous seeds.  
 CANT, Messrs. F., Colchester. Roses for trial.  
 CARPENTER, G., Byfleet. Lachenalia for trial.  
 CARTER, Messrs., London. Peas, Swedes, Turnips, Potatos, for trial.  
 CARTER PAGE, Messrs., London Wall. Roses for trial.  
 CAVE, G. H., Darjeeling, India. Miscellaneous seeds.  
 CAYEUX & LE CLERC, Messrs., Paris. Irises for trial.  
 CERNAUTI BOTANIC GARDEN. Miscellaneous seeds.  
 CHAPMAN, Messrs. H., Rye. Nerines for trial.  
 CHEAL, Messrs., Crawley. Dahlias for trial.  
 CHELSEA PHYSIC GARDEN. Miscellaneous seeds.  
 CHRISTY, W. M., Emsworth. Helianthemums.  
 CHURCHILL, Mrs., Horsell. Irises.  
 CLARK, W. A., York. Irises for trial.  
 CLARKE, Colonel S., Cuckfield. Dwarf Birch.  
 COBB, A. J., Reading. Dahlias for trial.  
 COOPER TABER, Messrs., London. Marrow, Turnips, Swedes, Peas, Spinach, Savoys, Cabbages, Kohlrabi, Celeriac, Lavatera, Nigella, Nemesia, Portulaca, for trial.  
 COPELAND, W. F. M., Southampton. Miscellaneous seeds from New Zealand.  
 COPENHAGEN BOTANIC GARDEN. Seeds of *Fritillaria kamschatcensis*.  
 CORUS VAN BEUSEKOM, Messrs., Holland. Spinach for trial.  
 CRAMSIE, Mrs., London. Stock seeds.  
 CRANE, M. B., Merton. Seedling Plum for Fruit Testing Scheme.  
 CRAVEN, Messrs., Evesham. Banding materials, &c., for trial.  
 CRIMEA BOTANIC GARDEN. Miscellaneous seeds.  
 CULLEN, Messrs., Witham. Swedes, Turnips, Peas, for trial.  
 CURTIS, S. F., Lancaster. Sweet Pea.  
 DAHNFELDT, L., & T. JENSEN, LTD. Turnips, Swedes, for trial.  
 DARMSTADT BOTANIC GARDEN. Miscellaneous seeds.  
 DAWKINS, A., Chelsea. Melon seed for trial.  
 DEWBERRY, S., Sevenoaks. Strawberry plants.  
 DICKINSON, Mr., Byfleet. One load of Lime.  
 DICKSON, Messrs. H., Belfast. Roses for trial.  
 DICKSON & ROBINSON, Messrs., Manchester. Swedes, Turnips, Cabbage, Potatos, for trial.  
 DICKSON, Messrs. ALEX., Belfast. Peas, Roses, for trial.  
 DIVERS, W. H., Surbiton. Apple grafts.  
 DOBBIE, Messrs., Edinburgh. Sweet Peas, Turnips, Swedes, Potatos, Dahlias, Winter Spinach, Roses, for trial.  
 DORPAT BOTANIC GARDEN. Miscellaneous seeds.  
 DRESDEN BOTANIC GARDEN. Miscellaneous seeds.  
 DUBLIN BOTANIC GARDEN. Miscellaneous seeds.  
 DUNEDIN CITY CORPORATION. Miscellaneous seeds.  
 DYKES, W. R., Guildford. Seed of *Fritillaria pallidiflora*; Iris 'Amber,' *Iris nepalensis*.  
 EASLEA, Messrs., Leigh-on-Sea. Roses for trial.  
 EDINBURGH ROYAL BOTANIC GARDEN. Miscellaneous plants and seeds.  
 ELLIOTT, C., Park Ridge, U.S.A. Sweet Pea for trial.  
 ELLIOTT, C., Stevenage. Plants of Dianthus 'Edinboro,' *Gentiana pyrenaica*, *Meconopsis quinqueplineria*, seed of *Meconopsis*. Miscellaneous plants and seeds.  
 FARGUS, Mrs., Exmouth. Wallflowers.  
 FINDLAY, R., Greenwich Park. Seed of hybrid Primulas.  
 FLORENCE BOTANIC GARDEN. Miscellaneous seeds.  
 FORTVOT, Lord, Perth. Miscellaneous seeds.  
 FRIKART, M. C., Switzerland. Asters.  
 FULFORD, F., Tarbolton. Potatos for trial.  
 GALSWORTHY, F., Chertsey. Miscellaneous seeds from New York.  
 GARDEN SUPPLIES LTD., Liverpool. Potatos for trial.  
 GARVIN JONES & INGWERTSON, Messrs., Letchworth. Miscellaneous seeds.  
 GEMMELL, R. K., & Co., Glasgow. Swedes for trial.  
 GIBBS, Hon. VICARY, Elstree. Miscellaneous plants.  
 GLASGOW BOTANIC GARDENS. Seeds of *Todea superba*, *T. hymenophylloides*, miscellaneous seeds.  
 GLASNEVIN BOTANIC GARDENS. Nerines for trial.  
 GODFREY, Messrs., Exmouth. Dahlia for trial.  
 GÖTEBORG BOTANIC GARDEN. Miscellaneous seeds.



- GOTTINGEN BOTANIC GARDEN. Miscellaneous seeds.  
 GREEN, H., Maidstone. Seed pods of *Aristolochia* 'Sipho.'  
 GREGORY, Lady, Sevenoaks. Collection of plants.  
 GRONINGEN BOTANIC GARDEN. Miscellaneous seeds.  
 GROVE, A., London. Bulbs of *Lilium tenuifolium*.  
 GUNTHER, C., Hawkhurst. Miscellaneous cuttings.  
 HAARER, A. H., Tanganyika. Seed of *Clematis* sp.  
 HAINSWORTH, H., St. John's Park, S.E. Seed of Yellow Daisy.  
 HANBURY, C., Italy. Miscellaneous seeds.  
 HANSEN, J., Aldwych. Bolens Garden Tractor for trial.  
 HARDY PATENT PICK CO., THE, Sheffield. Spade and trowels for trial.  
 HARLEY, A., Kirkaldy. Seeds of *Gentiana Farreri* and *Meconopsis*.  
 HARRISON, Messrs., Leicester. Turnips, Swedes, Peas, Spinach, for trial.  
 HAY, T., Hyde Park. Seed of *Ceanothus spinosus*, *Dicentra chrysantha*, Lupines, and *Frumentia mexicana*, Primula 'Red Hugh.'  
 HEIDELBERG BOTANIC GARDEN. Miscellaneous seeds.  
 HEINEMANN, F. C., Erfurt. Spinach for trial.  
 HEPBURN, T., Greenwich. Seed of *Wythia helianthoides*, *Hedysarium coronarium*.  
 HICKS, E. J., Twyford. Roses for trial.  
 HILLIER, Messrs., Winchester. Shrubs.  
 HINCHLIFF, Miss K., Instow. Aster 'Worlington White' for trial.  
 HOLT-EVANS, E. E., Cheltenham. Bulbs of Lily.  
 HOOPER, C. H., Wye. Copy Bulletin 10 on Fruit Pollination.  
 HORNIBROOK, M., Ripley. Miscellaneous plants and seeds.  
 HOWELL, Miss, Egypt. Seed of big White Daisy with blue centre.  
 HUGHES, Mr., Lyonshall. Apple.  
 HUNTER, E. C. C., Handforth. Bulbs of *Camassia* sp.  
 HURST, Messrs., London. Peas, Spinach, for trial.  
 HUTCHINSON, Admiral J., Yealmpton. Plant of unnamed Aster.  
 INNSBRUCH BOTANIC GARDEN. Miscellaneous seeds.  
 IRELAND & HITCHCOCK, Messrs., Marks Tey. Sweet Peas for trial.  
 JACOB, Rev. J., Whitchurch. Nerines for trial.  
 JEKYLL, Miss G., Godalming. Plants of *Dentaria diphylla*, miscellaneous seeds.  
 JENA BOTANIC GARDEN, Germany. Miscellaneous seeds.  
 JENKIN, Dr. N., Hindhead. Seedlings of *Gentiana acaulis*.  
 JOHN INNES INSTITUTION, Merton. Strawberry plant.  
 JOHNSON, Messrs. W. W., Boston. Spinach and Peas for trial.  
 KEITH-JONES, F., Hove. Potatos for trial.  
 KELWAY, Messrs., Langport. Peas, Turnips, Swede, for trial.  
 KENT & BRYDON, Messrs., Darlington. Irises for trial.  
 KEW, ROYAL BOTANIC GARDEN. Miscellaneous seeds and plants.  
 KIEL BOTANIC GARDEN. Miscellaneous seeds.  
 KIRCH, C., Beckenham. Crimson Auricula and Saxifragas.  
 KITSON, R., Torquay. *Lilium regale*.  
 KLOOSTERHUIS, E., Uckfield. Black currant for trial.  
 LACAITA, C. C., Petworth. Seed of *Dianthus vulturias*, *D. liburnicus* var. *lucarnus*, *D. Balhisii*, *Adenocarpus Bacqueti*.  
 LADHAMS, Messrs. B. Miscellaneous seeds.  
 LAING & MATHER, Messrs., Kelso. Seeds.  
 LANGRIDGE, Mrs., Kenya. Lupines from Kenya; seeds of *Vigna* sp., *Gladiolus* sp.  
 LAWRENCE, Sir Wm., Dorking. Irises.  
 LAWRENSON, T. A., Newcastle. Plant of *Juniperus communis*.  
 LAXTON, Messrs., Bedford. Fruits for commercial trials; Peas for trial.  
 LEENDERS, Messrs., Holland. Roses.  
 LEPARD, Mrs., Ringwould. Seeds of *Anemone sulphurea*.  
 LEWIS, C. McK., U.S.A. Book, "America's Greatest Garden."  
 LEYDE BOTANIC GARDEN. Miscellaneous seeds.  
 LODER, G. W. E., Ardingly. Miscellaneous seeds.  
 LOFTHOUSE, T. A., Middlesbrough. *Viola arenaria*.  
 LOIRET BOTANIC GARDEN. Miscellaneous seeds.  
 LONG, E., India. Seeds of *Lilium polyphyllum*.  
 LOUVAIN BOTANIC GARDEN. Miscellaneous seeds.  
 LOWE & GIBSON, Messrs., Crawley. Irises for trial.  
 LYONS BOTANIC GARDEN. Miscellaneous seeds.  
 MCGREDY, Messrs., Portadown. Roses for trial.  
 MACK & MILN, Messrs., Darlington. Potatos for trial.  
 McLAREN, Hon. H. D., Bodnant. *Rhododendron eximium* x *sino-grande*.

- MACOUN, W. T., Ottawa. Collection of trees.  
 MAGOR, E. J. P., St. Tudy, R.S.O., Cornwall. Rhododendrons.  
 MARSHALL, Miss A., Oxford. Seeds from N. Queensland.  
 MARTINEAU, Mrs., Mount Street, W. I. Seeds of *Acacia bisca*, *Melia Azedarack*.  
 MAUGER, Messrs., Guernsey. Lachenalias for trial.  
 MINISTRY OF AGRICULTURE AND FISHERIES. Peas for trial; seed of Japanese *Pyrethrum*.  
 MITCHENER, M., Purley. Plants of Erigeron.  
 MORSE, C. C., San Francisco. Sweet Peas for trial.  
 MORTEN, A. J., Hartpury. Roses for trials.  
 MOSCOW BOTANIC GARDEN. Miscellaneous seeds.  
 MUNICH BOTANIC GARDEN. Miscellaneous seeds.  
 MURRELL, E., Shrewsbury. Peas for trial.  
 MUSEUM OF NATURAL HISTORY, Paris. Miscellaneous seeds.  
 MUSGRAVE, C. T., Hascombe. Miscellaneous seedlings; *Pulmonaria angustifolia* 'Miss Jekyll,' *Dianthus callizonia*, *Mimulus Lewisii*; cuttings of *Cytisus Emerus*; miscellaneous seeds.  
 NAPLES BOTANIC GARDEN. Miscellaneous seeds.  
 NUNHEM, Messrs., Holland. Peas, Spinach, for trial.  
 NUTT, British Columbia. Miscellaneous plants.  
 NUTTING, Messrs., London. Peas, Turnips, Swedes, Marrow, Spinach, for trial.  
 OLIVER & HUNTER, Messrs. Seed of Campanula 'Miranda,' *Primula elatior* × *Juliae*.  
 OLSEN, Messrs., Denmark. Turnips, Swedes.  
 OPPENHEIMER, Mrs., Maidenhead. Seeds of *Viburnum rhytidophyllum*.  
 ORMSBY, Miss, Co. Mayo. Seeds for distribution.  
 ORPINGTON NURSERIES, Orpington. Irises for trial.  
 OSLO BOTANIC GARDEN. Miscellaneous seeds.  
 OTTAWA EXPERIMENTAL FARM. Miscellaneous seeds.  
 PALAIRET, L. C. H., Exeter. Miscellaneous plants.  
 PALERMO BOTANIC GARDEN. Miscellaneous seeds.  
 PARMA BOTANIC GARDEN. Miscellaneous seeds.  
 PERRY, A., Enfield. Irises for trial; miscellaneous seeds.  
 PETRE, Colonel, Norwich. Black Currants for trial.  
 PILKINGTON, G. L., Liverpool. Irises for trial.  
 POULSON, D. S., Copenhagen, Denmark. Roses for trial.  
 POULTON, Mrs., New Zealand. Seeds of *Celmisia coriacea*, and sp.  
 PRICHARD, M., Christchurch. Saxifragas.  
 RAGIONIERI, Dr., Florence. Four varieties of *Ranunculus*.  
 RASMUSSEN, J., Sweden. Peas, Beans, Carrots, Swedes, Beets.  
 RAY, W., Grayshott. *Saxifraga Sundermannii rosea*, *Linnaea borealis canadensis*.  
 RENDLE, Dr., London. Plants of Tradescantia.  
 RICARDO, Miss D., Wimborne. *Iris sibirica* 'The Emperor.'  
 ROBSON, H. L., Italy. Seed of Pepper tree.  
 ROGERS, R. B., Launceston. Seed of Primulus.  
 ROGERS, W. H., Southampton. *Cistus* × *Rogersii*.  
 ROSS OF BLADENBERG, Sir JOHN, Rostrevor. Miscellaneous seeds.  
 SALMON, C., Reigate. *Alchemilla glomerans*, *Carex stictocarpa*, *Iris foetidissima citrina*, *Teucrium Chamaedrys*.  
 SCANDINAVIAN SEED CO., and R. WIBOLTT LTD., Denmark. Turnips, Swedes, for trial.  
 SEABROOK, Messrs., Chelmsford. Grafts of Apple.  
 SEWELL, A. J., Weybridge. Miscellaneous plants.  
 SHOESMITH, H., jun., Woking. Dahlia for trial.  
 SIMPSON, W. H., Birmingham. Potatos, Peas, Turnips, Swedes, Spinach, for trial.  
 SMITH, Messrs. C., Guernsey. Nerines for trial.  
 SPEED, H. J., Evesham. Peas for trial.  
 SPINK, G. T., Bristol. Strawberry plants.  
 SPRUIJT, Messrs., Holland. Spinach for trial.  
 STOCKHOLM BOTANIC GARDEN. Miscellaneous seeds.  
 STOKES, Lady, Ockham. Seedlings of *Pittosporum* 'Tobira.'  
 STOKES, Messrs., Trowbridge. Asters for trial.  
 STONEHOUSE WORKS CO., West Bromwich. Miscellaneous washes for trial.  
 STREDWICK, Messrs., St. Leonards-on-Sea. Dahlias for trial.  
 STUART & MEIN, Messrs., Leith. Swede, Cabbage, for trial.  
 STURTEVANT, Mrs. G., Mass., U.S.A. Irises for trial.  
 SUPERINTENDENT OF GREENWICH PARK. Miscellaneous seeds.

- THORRINGTON, F. W., Hornchurch. Grafts of Apples.  
 TRAIL, A., Biggar, Lanark. Black Currants for trial.  
 TRESEDER, Messrs. W., Cardiff. Dahlias for trial.  
 TRINITY COLLEGE BOTANIC GARDEN, Dublin. Miscellaneous seeds.  
 TROTTER, R. D., Ockley. Plants of Gold-laced Polyanthus, miscellaneous seeds.  
 TURNER, C., Slough. Dahlia for trial.  
 UNKNOWN SOURCES. Cotoneaster and New Zealand seeds.  
 UNWIN, W. J., Histon. Sweet Peas for trial.  
 UPPSALA BOTANIC GARDEN. Miscellaneous seeds.  
 URQUHART, P. J., South Africa. Dahlias, Montbretia.  
 VAN DER VELD, G., Lisse, Holland. Peas for trial.  
 VAN DE WEYER, W., Corfe Castle. Cuttings of *Vinca difformis alba*.  
 VAN ROSSEM, G. A., Naarden, Holland. Roses for trial.  
 VARIAN, W., London. Asters, seeds of Aquilegias.  
 VEITCH, R., Exeter. Swedes, Turnips, Peas, Nerines, for trial.  
 VILMORIN ANDRIEUX ET CIE, Messrs., Paris. Irises for trial; miscellaneous seeds.  
 VOSS, Messrs. W., London. Lime-Sulphur, Creol, Borderite, Calcium Cascinate, Reinforced Cattercab, Vosstix for trial; seed of *Piptanthus nepalensis*.  
 WAGENINGEN AGRICULTURAL ACADEMY. Miscellaneous seeds.  
 WALDREN, T., Stratford-on-Avon. 'Gripits' for trial.  
 WALKER, F., Tasmania. Scions of Tasmania and Australian fruits.  
 WALKER, H. J. O., Budleigh Salterton. Delphinium, *Sedum compressum*, *Leptospermum obovatum*; miscellaneous seeds.  
 WALLACE, R., & Co., Tunbridge Wells. Irises for trial.  
 WALLER FRANKLYN SEED CO., California. Miscellaneous seeds for trial.  
 WARBURG, Sir O., Headley. Orchids and miscellaneous seeds.  
 WARD, H. P., Nairobi. Seed of *Acacia Cunninghamii*.  
 WARNER, S. A., Alton. Miscellaneous seeds.  
 WARSAW BOTANIC GARDEN. Miscellaneous seeds.  
 WATERER & CRISP, Messrs., Twyford. Irises for trial.  
 WATKINS & SIMPSON, Messrs., Covent Garden, W.C. 2. Swedes, Turnips, Spinach, for trial; Geum seed.  
 WATSON, Messrs., Dublin. Escallonia and Berberis.  
 WEBB, Messrs., Stourbridge. Swedes, Turnips, Peas, for trial.  
 WEMBLEY, Bermuda Section. Bulbs of Bermuda Lily.  
 WEZELENBERG, Messrs., Holland. Roses for trial.  
 WHITE, H., Sunningdale. Shrubs.  
 WILLIAMS, Dr. A. H., Horsham. Miscellaneous seeds.  
 WILLIAMS, J. C., Gorran. Miscellaneous seeds, *Rhododendron Griersonianum*.  
 WINTER, G. L., Bude. Plants of *Lichium Wilddpretii*.  
 WRAY, W., Grayshott. Plant of Saxifraga 'Maurice Pritchard.'  
 WRIGHT, R. G., Aylesbury. Miscellaneous seeds.  
 YATES, Messrs., Evesham. Peas for trial.  
 YONGE, Rev. G., Guildford. Plants of *Viola blanda* from New England.  
 ZWAAN, A. R., Holland. Spinach for trial.  
 ZWAAN & DE WILJES, Messrs., Holland. Spinach for trial.

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Edited by  
A. G. TANSLEY and T. F. CHIPP.

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